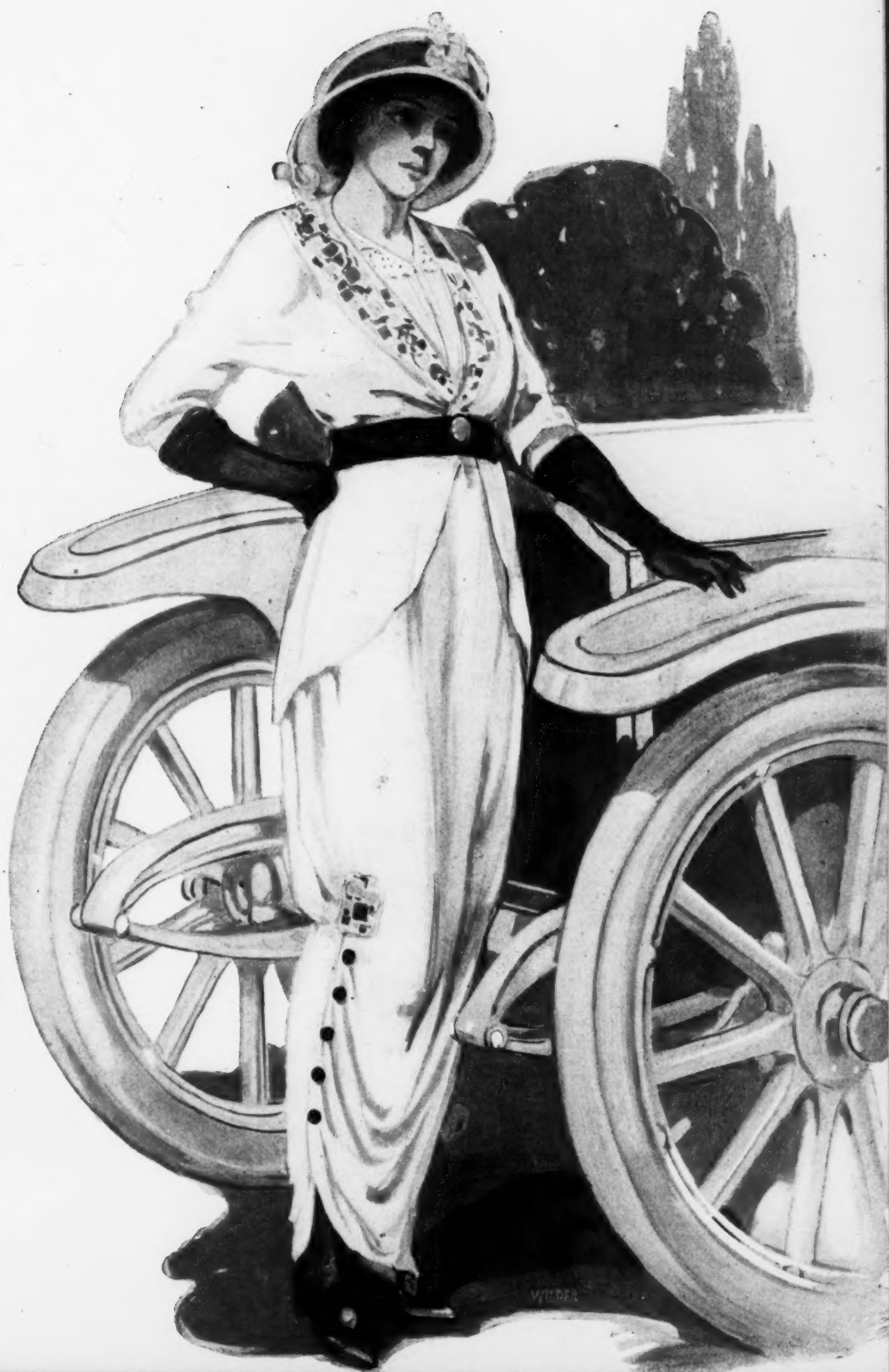
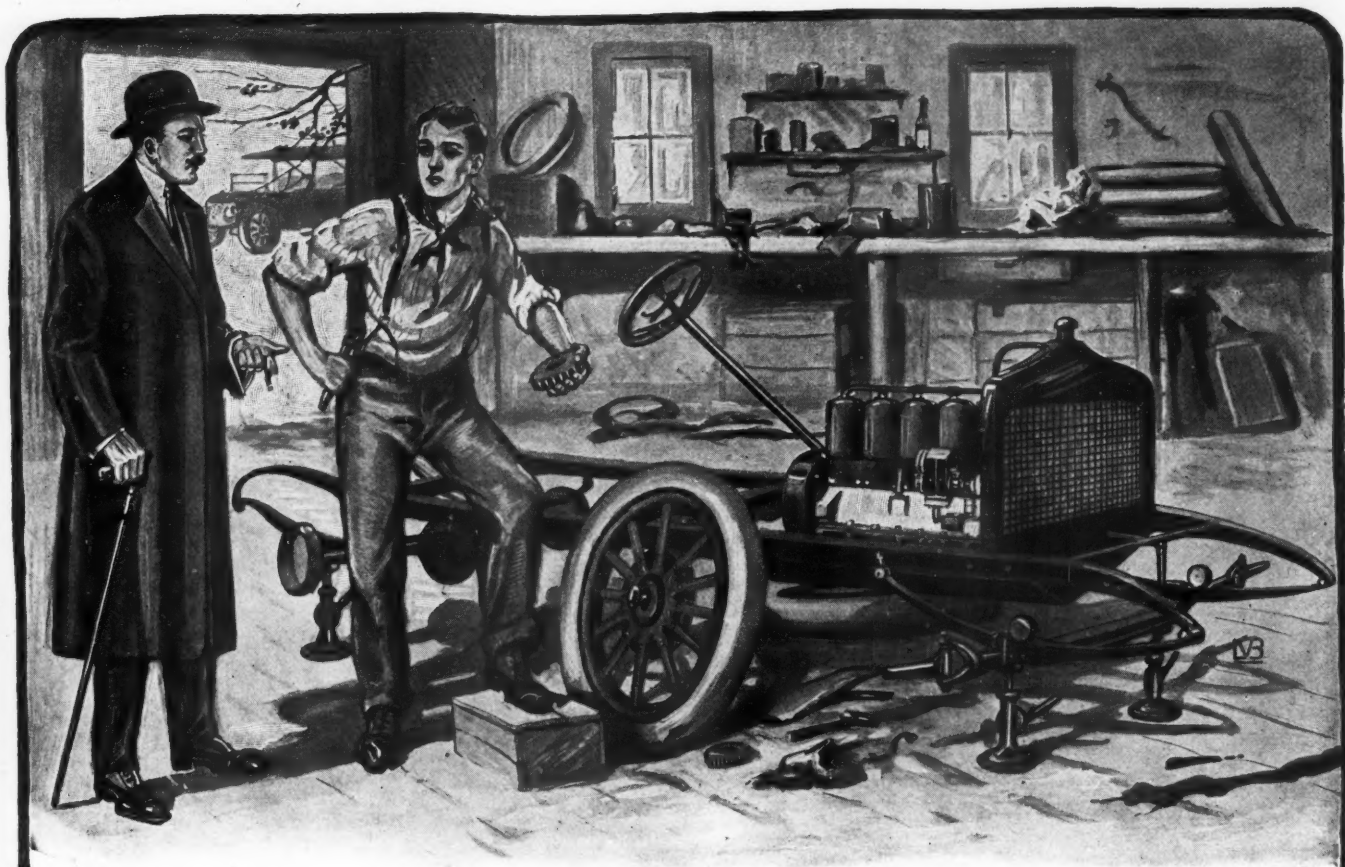


MOTOR AGE

July 10, 1913
Ten Cents a Copy

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of the Fourth
Turn Westward
the Goggles
of a Continent**



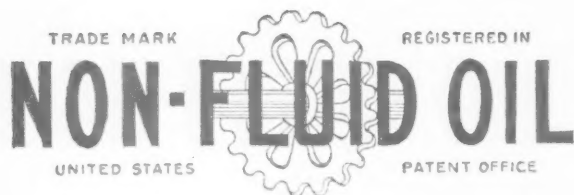


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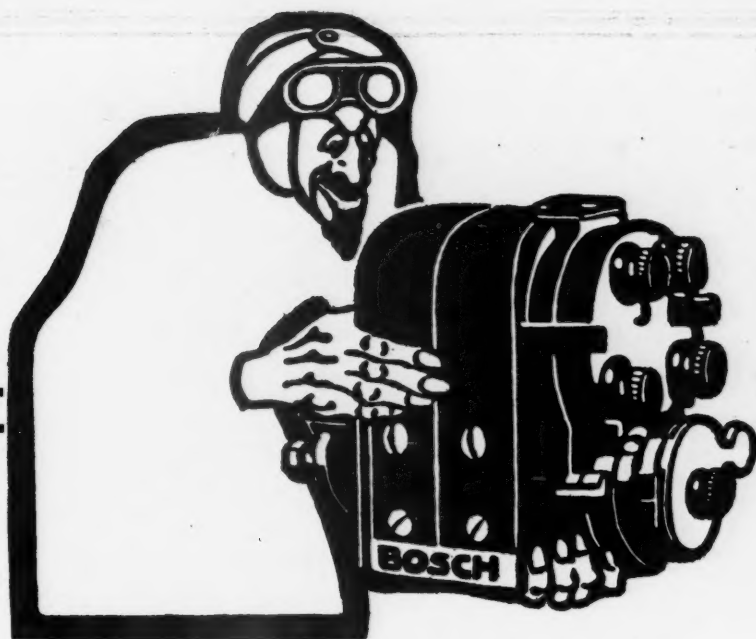
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MOTOR AGE



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Volume XXIV

JULY 10, 1913

No. 2

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MOTOR AGE

Motor Racing a Feature of National Holiday



While bombs burst in air and in juvenile fingers,
While orators raved in forensics profound,
Old P. D. Q. Mercury stepped on the throttle
To break nonstop records and cover much ground:
He jumped from Los Angeles up to Tacoma,
He flew through Columbus and Sioux City too
And hurdled the mountains 'round quaint Albuquerque
Before he retired when his car blew a shoe.

While vet'rans of Gettysburg gathered 'round campfires,
While sad picnic parties were dodging the rain,

An army of speed kings was harvesting kale seed
And showing the nation the Fourth could be sane
The roaring of motors was heard in five cities

By J. C. Burton

And numerous hamlets of non-rhyming name
The festive fire-cracker and deadly toy cannon,
Both piqued and outclassed, feebly popped in their shame.

A native son, Verbeck, replenished a bank roll
And won a green garland for head shy on hair
By driving o'er mountains to gay Sacramento—
A town in the state that's the home of the "bear."
Earl Cooper, of Stutz fame, showed his independence,
And also some speed, to a Tacoma throng
By taking two races from Burman and Tetzlaff,
Who joined the spectators when motors went wrong.

The Fourth was a day of rejoicing for Mulford,
The boy with the face of perpetual smiles,
Who shattered eight records and several ambitions
In a dirt track migration of 200 miles.
The patriot sings of the triumphs of gen'als
Who conquered the redcoats and broke George's plate,
But I string my lyre to encourage the Mason
Which out of twelve races, could win only eight.

Verbeck in Fiat Takes Los Angeles-Sacramento Race

Fifty Start, Eighteen Finish in Coast Classic



In the money in coast road race—Upper left hand corner, Oldfield; upper right, Soules; center, Beudet; lower left, Fleming; lower right, Hanshue

By W. H. B. Fowler

SACRAMENTO, Cal., July 5—The Panama-Pacific road race has come and gone, and is unanimously declared the most remarkable road race ever held. Fifty cars left the starting line in Los Angeles yesterday. The first, a Fiat, reached Sacramento, the state capital, 443.6 miles distant, through mountains and valleys, in 11 hours 1 minute 16 seconds. The next 28 minutes witnessed the arrival of no fewer than five more of the contestants, notwithstanding the great distance and many trying conditions. Within 2 hours and 15 minutes eighteen cars had passed the checkered flag at the state fair grounds at Sacramento, and before the race was called off several additional machines checked in.

All Praise the Race

Old-timers like Barney Oldfield, who took third in a Fiat; Jack Fleming, Vanderbilt cup veteran, who took sixth with a Pope-Hartford; Harris Hanshue, veteran grand circuit driver, who took ninth with an Apperson; Frank Verbeck, holder of world's 24-hour motordrome record, whose Fiat yesterday won the Panama-Pacific; Louis Nikrent, holder of many coast records, and Teddy Beudet, who 2 years ago cleaned up about every record in California—all these men declare that the Panama-Pacific road race is the greatest contest in which they have ever participated. It is the greatest test of a car

under every condition of road, and more than that, they declare, it is the supreme trial of skill and nerve and endurance of the driver. It is predicted that next year's entry list will be 100 instead of fifty, and it is anticipated that those manufacturers who take part in such events will quickly avail themselves of the opportunity to enter cars for their own satisfaction, as well as for the purpose of demonstrating their speed, power and reliability to the general public.

All California is enthusiastic over the race. The managers had all kinds of obstacles placed in their way by three northern counties—Santa Clara, San Mateo and Alameda—which refused to close their roads for the race as the state law permits them to do. This action caused the management to switch the finish of the race from San Francisco to Sacramento, which eagerly sought it and whose chamber of commerce offered to give a bonus of \$2,500. Now residents of the obstructionist counties are on the trail of the officials for their action. It is predicted that next year, when the race is to start in northern California and end in Los Angeles, the northerners will be bidding against each other for the privilege of having the start or to be en route.

Details of the Race

The race itself was a tremendous success. Long before midnight, Friday morning, July 4—the hour for starting—tremendous crowds assembled at the starter's

post in Los Angeles. At a signal given a few moments before the first car leaped across the line each of fifty drivers started his engine, and the crowd was thrilled and awed by the terrific expression of power.

After a journey of about 1½ miles through the city and streets, during which the cars were kept within the speed limit prescribed by the Los Angeles fathers, the racers entered upon the 30 miles of San Fernando boulevard where the drivers threw their throttles wide open and bit off miles in chunks. It was at this part of the route that Ralph Chandler and Dominic Basso, while practicing in an Alco car Wednesday evening, ran into a wagon filled with Mexican laborers, killing one of them, completely demolishing their car. Chandler and Basso were severely injured.

At Bakersfield

At Bakersfield, the first important checking station, another large crowd awaited the arrival of the racers. Their listening ears were rewarded at 4:24, when the distant roar of a flying machine could be heard. A moment later Cadillac No. 1 dashed into view and came to a halt at the control station. Seven minutes later, Verbeck, in a Fiat, flew alongside, having passed eight of those who started before him in the first of the arduous journey. Close at his heels, only 2 minutes away, the veteran Barney Oldfield came pounding along at the wheel of his 120-horse-



ROUTE OF LOS ANGELES-SACRAMENTO ROAD RACE

power Fiat. Beaudet driving Cadillac No. 8 swung into town 3 minutes later, 1 minute ahead of Omar Toft, in Simplex No. 5.

Soules roared into Fresno at 7:12, still holding a 9-minute lead over Verbeck. Both drivers had gained little on those following since leaving Porterville, but relative positions among the first five remained the same. Two hundred and seventy-eight miles had now been negotiated, and all of the cars seemed to be running as sweetly as sewing machines when passing through Fresno.

Verbeck Takes the Lead

Leaving Fresno for the 55-mile run to Merced, Verbeck made a sensational spurt, which eventually won him the race. Starting 9 minutes behind Soules, he pulled into the checking station at Merced full 5 minutes ahead of the plucky Cadillac driver. From that time to the finish at the fair grounds he never was headed.

Oldfield clung tenaciously to third position, passing through Fresno at 8:55. Omar Toft, in Simplex No. 5, also had made substantial gain and pulled up 8 minutes ahead of Beaudet in Cadillac No. 8.

At Stockton, 396 miles upon the way, Verbeck had increased his lead to 13 minutes, and was confident of victory, barring accidents or breakdowns. Soules, Oldfield, Toft and Beaudet followed determinedly in his dusty wake, making a final dash for the coveted finish line 47 miles away.

At 15 minutes past 11 o'clock a bugle call announced "Car in sight," and 3 minutes 16 seconds later the Fiat with Verbeck at the wheel and H. Ham as mechanic, swirled onto the track in a cloud of dust, encircled the track at a breakneck speed and finally pulled up before the judges' stand a winner.

Barney Oldfield at the helm of Fiat No. 7 won third prize in handy style. His elapsed time was 11:22:53. Barney remained at the wheel throughout the entire struggle and had he not proceeded 5 miles on the wrong road out of Fresno, he might have finished at the head of the list. Oldfield also had the misfortune to break a driving chain which became jammed in a spring clip. To straighten out this tangle consumed 11 golden minutes.

The tenth car to come into view of the crowd was granted the most enthusiastic reception of any of the racers. It was Buick No. 45, driven by Ed Waterman, Jr. This car, although among the last to start, won second prize, having come from Los

Angeles in the remarkable time of 11:21:25.

The list of mishaps occurring south of Bakersfield in the road race was small, but with machines it was different. Six racers came to grief. The most serious smash-up occurred 8 miles south of Bakersfield, when National No. 29 took a turn too fast and turned over three times. The car was reduced to wreckage and Mechanician Oakerman emerged with two broken ribs. Driver Stitt was only scratched.

The first mishap came just a few minutes after the start, when MacOmber, not yet out of Los Angeles, turned over on a sharp angle on Sunset boulevard. Neither of the men was hurt.

At Tropics the Apperson No. 4 crashed into the curb, broke a rear wheel and disarranged the carbureter, going out of the race. Bill Bramlett was not even scratched.

Some of the Accidents

Going through San Mesquite canyon the Cole damaged its clutch and quit. Touraine No. 16 got off the course going through San Fernando and in attempting to get back hit the fence and didn't stop until it had torn down about 30 feet of posts and boards and had to withdraw.

Bill Mellgren, driving National No. 47, heard something rattling as he was just outside of San Fernando and stopped to fix it. A big truck loaded with oil barrels came along and plowed right through the National outfit. Mellgren and Bill Carlton managed to get out of the way by a few inches. After the truck got through there was no use in fixing the National. Earl Devore's Stutz broke a crankshaft early in the race and ended the chances of that popular driver, who was regarded as a likely winner.

Los Angeles-Sacramento Finishers

Car and Driver	Time	M.P.H.
9 Fiat, Verbeck	11:01:16	39.39
45 Buick, Ed. Waterman	11:21:25	38.18
7 Fiat, Barney Oldfield	11:22:53	38.09
1 Cadillac, C. Soules	11:26:16	37.91
30 Alco, W. H. Carlson, Jr.	11:28:03	37.81
48 Pope-Hartford, J. Fleming	11:28:20	37.79
34 National, Barcroft	11:35:52	37.38
5 Simplex, Toft	11:39:32	37.23
33 Apperson, Hanshue	11:56:30	36.31
8 Cadillac, Beaudet	11:57:31	36.26
2 Simplex, Faulkner	12:03:50	35.94

21 National, Briscoe	12:03:55	35.91
43 Ford, Schnack	12:27:44	34.79
14 Overland, McKelvey	12:44:12	34.04
40 Stutz, Siefert	12:46:53	33.92
18 Buick, Nikrent	12:47:34	33.89
10 Mercer, Morris	13:14:48	32.73
20 Kissel, Kern	13:16:56	32.64

The first ten received prize money, the exact amount of which has not been decided. On the division of the funds in hand the winner will at once receive about \$6,500. Verbeck, it is stated, will be protested for alleged failure to stop in control at Fresno.

BAKERSFIELD HOLDS RELIABILITY

Bakersfield, Cal., June 28—The first motor endurance run ever held in the San Joaquin valley of California, in which ten touring cars were competing for a silver trophy cup awarded by the Morning Echo, was won by a Buick 25, driven by James L. Bruce. This Buick covered the entire 135-mile course over Mount Greenhorn in 7 hours 13 minutes, making a perfect score of 1,000 points.

Three cars tied for second place—a Buick 25, driven by W. E. Ferguson; Apperson Jackrabbit, driven by E. P. Hoisington, and Reo, driven by T. W. Marsh, they making 997 each. Their only penalty was 3 points for taking on water. A White driven by Jack Bayse scored 994, taking water twice; then followed Overland, driven by J. M. Dunn, 991; Overland, driven by Herman Erickson, 981½; Studebaker, driven by C. M. Buckman, 979; Henderson, driven by Herbert Slatford, 970, and Nyberg, driven by A. G. Leuschen, 930.

All the cars made the average required, 15 miles per hour. The individual prize for the best showing into Kernville, the first control, which was 65 miles from Bakersfield, was won by the Apperson. The two Buicks and the White divided the prize at the second control, Caliente, 102 miles from Bakersfield.

In order to arrive at the closest decision possible the rules committee made the taking on of water a penalty of 3 points right from the start. Under the American Automobile Association rules, the cars are allowed to take water twice without penalty between day and night controls. This run, made Sunday, June 22, was started at 6 a. m. and all the contesting cars were in the final control by 5:06:30 p. m.

Bakersfield is so elated over this run that another most likely will be held in the fall.



In the money in coast road race—Center, Siefert; lower row, from left to right, Faulkner, Kern, Fred Nikrent, Adams and Briscoe

Stutz Sweeps the Card at Tacoma's Road Race Meet

Cooper and Parsons Win All Three Events



VIEW OF HOMESTRETCH OF TACOMA STRETCH

By F. Kirby Haskell

TACOMA, Wash., July 7—Special telegram—With the running of the Montamarathon this afternoon, the curtain dropped on Tacoma's second annual speed carnival with Earl Cooper and Parsons, the Stutz drivers, holding the center of the stage and the consistently-performing Stutz monopolizing the spotlight.

Pitted against such veterans as Teddy Tetzlaff, Bob Burman and Hughie Hughes, Cooper, whose relief of Gil Anderson and the pursuit of Goux was one of the features of the 500-mile race at Indianapolis Memorial day, took two of the three races on the card, winning the 200-mile Potlatch trophy race on Saturday and capturing the 300-mile Montamarathon free-for-all today. Parsons, Cooper's teammate, was victor in the other event, the inter-city race run Saturday.

The meet was a clean sweep for the Stutz and consequently a clean sweep for American cars. Tetzlaff, driving the Fiat, failed to finish in either the Potlatch trophy race or the Montamarathon, while the best Burman could do was to take second in the Potlatch trophy event with the Keeton, his powerful German Benz being eliminated in today's contest.

The Tacoma speed carnival, although not inaugurated until last year, was an unqualified success. The attendance both days was flattering and the races keenly contested, insuring a continuation of the meet in 1913.

Cooper Again Scores

Tacoma, Wash., July 7—Special telegram—Roaring over the finishing line less than 2 minutes ahead of Dave Lewis, Earl Cooper of San Francisco, at the wheel of the sturdy Stutz, today won the 250-mile Montamarathon, the feature event and closing contest in Tacoma's second annual speed carnival.

In covering the 250 miles in 3 hours 32

minutes 8½ seconds, California's native son averaged 70.71 miles an hour and duplicated his victory of Saturday when he captured the 200-mile Potlatch trophy race. Cooper stopped but three times at his pit for tires and encountered no mechanical trouble.

Dave Lewis, driving the 70-horsepower Fiat, finished second and was a stubborn challenger all the way. Hughie Hughes was third in the Tulsa. Harry Endicott, with the diminutive Nyberg special, was the only other finisher. He received a piece of the added prize money through having a car which had a piston displacement of less than 450 cubic inches.

Two other starters, Nichols, the Apperson pilot, and Hanson, the Hudson en-

trant, were running when the race was called.

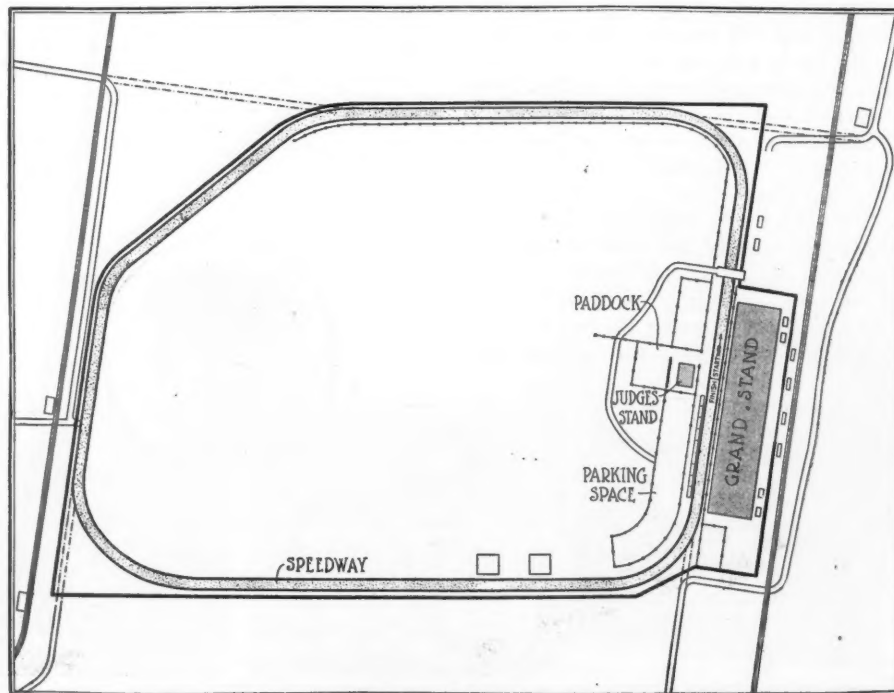
Four of the ten cars that faced the starter when the bomb was fired were docked at the pits disabled. Teddy Tetzlaff, driving the 120-horsepower Fiat, retired on the fourteenth lap when an oil pump broke. The fifteenth lap was disastrous for two other cars, Jeannette's Benz breaking a piston rod and Welch's Locomobile stripping its gears. Bob Burman docked the 120-horsepower Benz with a broken gasoline line after completing forty-eight laps.

The Montamarathon originally was scheduled to be run Sunday, but was postponed because of rain. Summary:

	Time	M.P.H.
Cooper, Stutz.....	3:32:08½	70.71
Lewis, Fiat 70.....	3:35:00	69.76
Hughes, Tulsa.....	3:39:55	68.28
H. Endicott, Nyberg.....	Flagged
Nichols, Apperson—Running when race was called.		
Hanson, Hudson—Running when race was called.		
Burman, Benz 120—Out on 49th lap, broken gas line.		
Welch, Locomobile—Out on 15th lap, stripped gears.		
Jeannette, Benz—Out on 15th lap, broken piston rod.		
Tetzlaff, Fiat 120—Out on 14th lap, broken oil pump.		

First Day's Results

Tacoma, Wash., July 5—Special telegram—In Tacoma's second Montemara road race meet today Cooper won the 200-mile Potlatch trophy race, piloting his Stutz to victory after fifty-seven laps around the 3½-mile course in 2:49:32, an average of 71.07 miles an hour. Burman in the Keeton won the second portion of the \$3,500 purse, doing the distance in 3:10:28. Endicott in his Nyberg was



THREE AND ONE-HALF MILE ROAD RACE COURSE AT TACOMA

flagged off the track at the end of the fifty-second lap, but annexed a bonus of \$150 for cars under 350 cubic inches finishing.

Tetzlaff was the first to get away and was accorded a tremendous ovation. He was followed by Endicott. Latta in the Inter-State, Cooper in the Stutz, Hughes driving the Tulsa and Burman in the Keeton in the order named.

The twenty-sixth lap was disastrous. Tetzlaff went out with a broken camshaft and Burman had cylinder trouble which probably cost him the race. Welch in a Locomobile was forced out in the twenty-seventh lap by a broken camshaft, and Hughes in the forty-sixth lap on account of burned-out bearings. In the forty-sixth lap the Inter-State crept into second place, but lost time at the pits and was succeeded by Burman at the finish. Cooper was 6 minutes ahead, Burman one lap ahead of the Inter-State, and Endicott five laps behind the Inter-State.

The Inter-City Race

In the inter-city race it was mostly Parsons and his Stutz. He was first away at the start, and held the place against speedy drivers until the final flag. Parsons made 102.167 miles in 1:33:53½, the average for the entire distance being 65.17. E. J. Cameron, of Victoria, in a Stutz was second in 1:36:36½, while Hanson in a Hudson special came in in 1:51:16 with third place. Leybold in a Buick took fourth place, his time being 2:12:59½.

The contest narrowed on account of a number of entries dropping out early in the race. The Apperson was out at the end of the first lap and again in the fourth on account of cylinder trouble. Ballard in a Thomas had engine trouble in the sixth lap and retired. The eight-cylinder Romana was out at the close of the fifth. The Buick driven by Leybold ran twenty-nine laps without a stop, being the only car to make a good record and winning the special prize. Staley in a Studebaker killed a dog in the twenty-fourth lap, which forced the car out of the race.



PARSONS IN STUTZ, WINNER OF TACOMA'S INTER-CITY RACE



COOPER IN STUTZ, STAR PERFORMER AT TACOMA

Plans Complete for National Tour Start

MINNEAPOLIS, Minn., July 5—Plans are all set for the ninth annual national reliability tour of the A. A. A., leaving Minneapolis at 8 a. m., July 11, and ending at Glacier Park station, Mont., July 19. Twenty-four entries are in and half a dozen more are in sight. The Krit team drivers have arrived and the Metz team, six in all, will arrive Monday.

Arrangements are complete for the hotel train, which is a duplicate of the Great Northern Oriental Limited. The train will have a dynamo car, baggage repair and supply car, newspaper printing car, six standard drawing room sleepers, two dining cars, observation compartment car. It will carry all baggage, furnish meals three times a day and lodgings at night. A daily paper will be issued, typewriters will be provided for the correspondents, photographers will have a developing room and all repairs for cars will be provided against. The train cost a quarter-million dollars.

Entertainment is to be provided by the commercial clubs at the night controls and over Sunday at Fargo. At the Sioux Indian reservation at Poplar, Mont., the Indians will give their annual pow-wow,

which they have held off for the tour. At Havre, Mont., a delegation of Piegan Indians will act as pilots to the end of the tour. At the camp at St. Mary's lake a pow-wow is to be given. The tourists will be in charge of special agents of the railroad company and under supervision of Jim Shoemaker, the personal representative of the road.

When the tourists have reached Glacier Park hotel they will take a plunge in the big pool. Later they will drive 32 miles into the park, the first park reservation road thrown open to the public, finished a year ago. The following day the motor cars will be loaded on freight cars and will be transported with the tourists by special train to Bolton. This is at the south end of the park, and from that point the tourists will drive their cars over the Park-to-Park road to Kalispell. The various civic organizations there will pilot the travelers through the famous scenic Flat-head valley.

From that point tourists can return by special train or drive to Yellowstone park or to the west. A special freight rate has been made for return of motor cars.

While the visiting motorists are in Minneapolis they will be entertained at the Bloomington club and with a tour over the famous Minneapolis boulevards and through the lake region. The entry list is as follows:

No.	Entrant and Town	Car
1	L. W. Hill, St. Paul.....	Packard
2	L. H. Fawkes, Minneapolis.....	Premier
3	Harry F. Legg, Minneapolis.....	Stutz
4	L. H. Fawkes, Minneapolis.....	Marmon
5	G. H. Votter, Boston.....	Metz
6	Charles Metz, Waltham.....	Metz
7	C. Walter Metz, Waltham.....	Metz
8	N. W. Automobile Co., Minneapolis.....	Krit
9	N. W. Automobile Co.....	Krit
10	N. W. Automobile Co.....	Krit
11	Dr. C. A. Smith, Devil's Lake, N. D.	Kissel Kar
12	L. C. Erbes, Merriam Park.....	Velle
13	R. W. Munzer, Minneapolis.....	Hupmobile
14	R. W. Munzer, Minneapolis.....	Hupmobile
15	R. W. Munzer, Minneapolis.....	Hupmobile
16	J. A. O'Brien, Minneapolis.....	Moon
17	E. B. Stimson, Minneapolis.....	Little
18	Dr. E. W. Humphreys, Moorhead, Minn.	Chalmers
19	Lewis C. Newlon, Fairmont, Mont.	Maxwell
20	E. A. Everett, Waseca, Minn.	Locomobile
21	F. J. Lyman, Minot, N. D.	Chalmers
22	Dr. J. R. Pence, Minot, N. D.	Ford
24	Dr. J. D. Park, Duluth, Minn.	Locomobile
	Mrs. Minnie Butchard, Hibbing, Minn.	Velle

Mulford in a Mason Wins 200-Mile Race at Columbus

Harry Knight Killed When Car Turns Turtle

By J. W. Lehman

COLUMBUS, O., July 4—The third annual 200-mile motor car race held at Columbus, O., July 4 under the auspices of the Columbus Automobile Club was won by Ralph Mulford in a Mason Special in the record time of 3 hours 21 minutes 48 seconds, which is the record for the distance on a dirt track. The previous mark was held by Spencer Wishart in a Mercer, who covered the distance in 1912 at Columbus in 3 hours 28 minutes 4.50 seconds.

The race was marred by a fatal accident, in which Harry C. Knight, driver, and Milton Michealis, mechanic on the Rovon Special, lost their lives. Knight was driving the new front-drive car, made by the Kinnear Mfg. Co., of Columbus, when the car skidded and blew the right rear tire. The car then turned turtle, throwing out both the driver and the mechanic. Knight was killed instantly while Michaelis lingered at a local hospital for 4 hours without regaining consciousness.

The car driven by Knight had a wheelbase of 142 inches and skidded badly on the turns. Knight was out of the race for more than 30 minutes repairing a valve, and upon his return started to regain some of the lost distance. He was anxious to show what was in the car when he took the turn at too fast a gait for the long wheelbase. Jenkins, who followed in a Schacht, ran over Knight, but he undoubtedly was dead by the time he was struck. He sustained a fractured skull, a portion being carried away, compound fractures of both legs and one arm, a broken jawbone and other injuries.

Mulford had the race all his own way from the fiftieth lap and would have lowered the mark by 10 minutes more had he been pushed. As it was he was only out of the race on one occasion for a few seconds for oil. His tires held up well and were in good condition at the close of the race.

Madden, driving a Nyberg, was second, having covered the distance in 3 hours 44 minutes 26.65 seconds. The Nyberg was only out three times, for tire changes, and raced consistently.

Reeder, driving a Mercer raceabout, was third in 3 hours 47 minutes 53 seconds, while de Palma was fourth in 4 hours 4 minutes 50.80 seconds.

Records which were broken were: 50 miles, Mulford, 49:51:15; 75 miles, Mulford, 1:15:43.70; 100 miles, Mulford, 1:40:43; 125 miles, Mulford, 2:05:14.45; 150 miles, Mulford, 2:30:33.60; 175 miles, Mulford, 2:57:50.35; 200 miles, Mulford, 3:21:48.

In all eight cars started in the race. They were: Mulford in a Mason Special; Madden in a Nyberg; Reeder in a Mercer

raceabout; de Palma in a Mercer Special; Jenkins in a Schacht; Knight in a Rovon Special; Rickenbacher in a Mason Special, and William Fritsch in a Cino called the Senate Flyer.

Rickenbacher took the lead from the start and held it to the thirty-third lap, when tire trouble caused him to leave the race for a short time. He went back in, but a broken transmission shaft caused him to leave at 107 miles. Fritsch had a broken cylinder and left at 33 miles. Knight's accident occurred at 110 miles. The other starters finished the race.

A crowd of immense size attended the race, which insures the continuing of the race next year. Summary:



MULFORD IN WINNING MASON AT COLUMBUS

Madden, Nyberg	3:44:26.65
Mulford, Mason Special.....	3:21:48
Rudee, Mercer	3:47:53
DePalma, Mercer	4:04:50.80
Jenkins, Schacht	4:05:57
Knight, Rovon, out; car overturned.	
Rickenbacher, Mason Special, out; broken transmission.	
Fritsch, Senate Flyer, out; broken cylinder.	

Masons and Case Shine at Sioux City

SIoux CITY, Ia., July 4—Special telegram—George Mason, driving a Mason Spécial, scored a "native son" victory today on the Sioux City 2-mile dirt track, winning the 40-mile free-for-all, the feature event of the first day's motor racing card, and taking the 16-mile contest in addition. The triumph of the chubby son of the Mason maker was a popular victory, as Mason is an Iowa boy and was at the wheel of an Iowa car.

Mason covered the twenty laps in the free-for-all in 32:36 and led from starting gun to checkered flag. He finished over 3 miles in front of Jack Newhouse, the driver of the Case Tornado, who won second money. Louis Disbrow, handicapped by tire trouble, was third in the Simplex Zip and showed spurts of 90 miles an hour in his pursuit of the leader.

It was a Mason day, the Mason drivers winning \$510 in prize money and four of the six events on the card, while the Case team annexed \$450 in cash prizes. While no track records were smashed, Joe Nikrent established a new mark by changing a wheel and tire in 16 seconds.

There were two minor accidents, a pebble hitting Bill Endicott's goggles and making a visit to an optician imperative, and the Case Special, driven by Joe Nikrent, catching on fire on the first lap of the free-for-all. Summaries:

Six Miles—Billy Chandler, Mason Special, won; H. A. Wetmore, Chalmers Blue Bird,

second; Bill Endicott, Case Bullet, third; Heine Ulbricht, Pirate, fourth; time, 5:27.

Ten Miles—Louis Disbrow, Case Dragon, won; Joe Nikrent, Case Special, second; Heine Ulbricht, Pirate, third; H. A. Wetmore, Chalmers Blue Bird, fourth; time, 8:40.

Sixteen Miles—George Mason, Mason Special, won; Joe Nikrent, Case Special, second; Louis Disbrow, Case Tornado, third; Shunk Moon, fourth; time, 13:39½.

Twenty Miles—Bill Snyder, Mason Special, won; Wetmore, Chalmers Blue Bird, second; Jack Newhouse, Case Special, third; time, 18:47.

Eight Miles Novelty Race—Joe Nikrent, Case Special, won; George Mason, Mason Special, second; time, 7:19.

Forty Miles Free-for-All—George Mason, Mason Special, won; Jack Newhouse, Case Tornado, second; Louis Disbrow, Simplex Zip, third; Wetmore, Chalmers Blue Bird, fourth; time, 32:36.

Disbrow Star on Second Day

Sioux City, Ia., July 5—Special telegram—Louis Disbrow was the star of the second and final day's events in Sioux City's annual speed meet on the 2-mile dirt track this afternoon, the veteran of the Case team establishing a new world's record of 9:24½ for 12 miles with the Simplex Zip and capturing the 48-mile sweepstakes feature at the wheel of the same car in 40:11.

The new world's record, which replaces the mark of 10:46 made by Disbrow at Lakeside, Cal., was made in the handicap race, which was the most spectacular event of the 2-days' racing card. Starting with George Mason in the Mason Special 1 minute behind the pacemaking Mercer, Disbrow gained the lead on the seventh mile and held it to the finish.

The 48-mile sweepstakes proved a sensa-

tional struggle between Disbrow and George Mason, the hero of the opening day's events, the former winning.

The Case drivers won the biggest slice of the prize money, \$675, although the members of the Mason team took four out of the six events on the card. Summaries:

Six Miles—Billy Chandler, Mason Special, won; Bill Endicott, Case Bullet, second; Wetmore, Chalmers Blue Bird, third; time, 5:17½.

Ten Miles—George Mason, Mason Special, won; Joe Nikrent, Case Special, second; Bill Endicott, Case Tornado, third; Louis Disbrow, Case Dragon, fourth; Shrunn, Moon, fifth; Broker, Marquette-Buick, sixth; time, 8:34½.

Eight Miles—Snyder, Mason Special, won; Newhouse, Case Special, second; Wetmore, Chalmers Blue Bird, third; time, 7:19½.

Twelve Miles—George Mason, Mason Special, won; Bill Endicott, Case Tornado, second; Louis Disbrow, Case Dragon, third; Joe Nikrent, Case Special, fourth; Billy Chandler, Mason Special, fifth; time, 9:58½.

Twelve-Mile Handicap—Louis Disbrow, Simplex Zip, won; Bill Endicott, Case Tornado, second; time, 9:24½.

Forty-Eight Mile Sweepstakes—Louis Disbrow, Simplex Zip, won; George Mason, Mason Special, second; Bill Endicott, Case Tornado, third; Joe Nikrent, Case Special, fourth; time, 40:11.

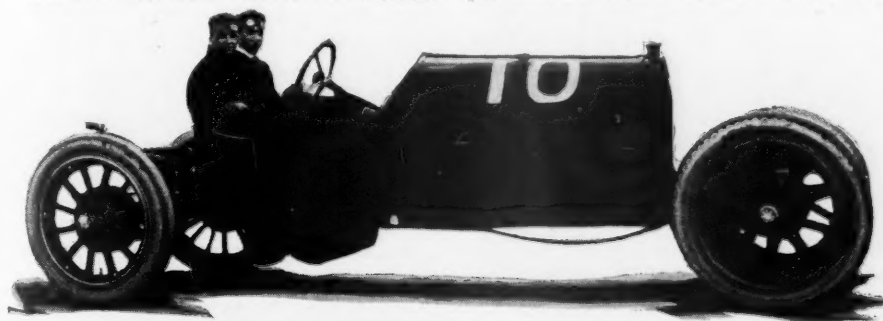
SPAIN HOLDS GRAND PRIX

London, June 17—Favored by the royal patronage of King Alphonso, the Spanish grand prix race was run over a 64-mile course on June 15 and won by Don Carlos de Salamanca in a Rolls-Royce car. The victor covered three laps or 192 miles in 3 hours 34 minutes and 12 seconds. A Rolls-Royce, driven by an Englishman, Platford, took third place. The second car was a Lorraine-Dietrich.

The king of Spain was so interested in the contest, which was run over a most difficult course with sharp turns and steep ascents, that he insisted at the conclusion of the race that the Spanish grand prix should become an annual affair.

The race was a handicap contest. There was a minimum weight for each car according to its horsepower, which was arrived at by a formula which included the revolutions per minute of the engine at its maximum power. The competitors had to drive fully equipped four-seated touring cars with hood, lamps and two spare tires. All bonnets were sealed before the start, the gasoline carried being measured previously, and drivers were not allowed to take on water during the race. The order of finish follows:

Driver and Car	Time
D. Carlos de Salamanca, Rolls-Royce	3:34:12
Marques de Ugena, Schneider	4:07:51
rich	3:37:04
G. Eric Platford, Rolls-Royce	3:39:56
Marques de Aulencia, Lorraine-Dietrich	4:08:22
Conde de la Patilla, Minerva	4:18:19
D. Angel Santibanez, Panhard	4:19:57
Duque de Zaragoza, Mercedes	4:55:42
D. J. Doman Manzonza, Opel	5:02:26
Don Juan G. Ocana, Delaunay-Belleville	



THE LATE HARRY KNIGHT IN THE ROBAN SPECIAL

Racing Test of Gasoline and Benzol

LONDON, June 25—The June meeting of the Brooklands Automobile Racing Club, held at Brooklands last Saturday, is likely to prove a landmark in the solving of the fuel problem in this country, for the enterprising promoters bestowed a real benefit on the motoring community by so arranging the program that a good comparison could be struck between the capabilities of gasoline and benzol as fuel for cars.

The idea was that first a handicap should be decided over a distance of about 8½ miles for cars which the handicappers considered capable of doing 70 miles per hour or more for a single flying lap, gasoline being used; then, later in the day, another race was held over a similar distance for cars of the same speed capabilities, but using benzol exclusively as a fuel during the race.

It was at first stipulated that cars would only be allowed to enter for the latter race if they had competed in the former, but this idea was subsequently abandoned. It turned out to be rather a pity, because a car won the benzol race which hadn't run in the gasoline handicap, and so a valuable comparison which might have been drawn was lost. But, nevertheless, there were plenty of opportunities of comparing notes. The car which won the benzol race was a Sunbeam of 15.9 rating, driven by J. H. Toop, and its average speed was 80¼ miles per hour. The gasoline race was carried off by a 48.6 Mercedes, driven by F. W. Brown, at an average speed of 83½ miles per hour for the distance.

Fortunately a 23.8 Vauxhall, driven by A. J. Hancock, came home second in both events, and thus provided the best possible opportunity of drawing conclusions. The Vauxhall did its fastest lap—a distance of about 2¼ miles—in the gasoline handicap at 103.33 miles per hour, and in the benzol race at 102.06. The second laps in both instances, however, were very close, the speed on gasoline being 101.85 miles per hour, and on benzol 101.43 miles per hour.

The figures in the case of the 17.9 S. C. A. R., which filled the third place in both events, were also pretty close, the fastest lap on gasoline being done at 76.97 miles per hour and that on benzol at 75.57. The

fastest lap of the winning car in the benzol handicap, it is interesting to note, was done at the surprising rate of 84.70 miles per hour.

With the other cars the general result was that the less experienced drivers failed to get as good effect from benzol as they did from gasoline; and though in no instance did the new spirit do better than the older, there nevertheless was in some cases very little to choose between the two performances.

The result is bound to be a popularization of benzol in Britain, for Brooklands racing is followed by a big public, and when the car owner sees how close the performances were, he'll conclude that he doesn't care so much about the decimal point off the speed of his car entailed by using benzol, so long as his fuel bill gets smaller. The affair, too, had an official smack, for the Royal Automobile Club presented the first prize in the benzol race, and the Automobile Association and Motor Union, and the trade body, the Society of Motor Manufacturers and Traders, conjointly provided the second and third.

The price of gasoline still remains at the high figure it reached at the beginning of the year, and there seems little prospect of a decrease; but, thanks to the booming of benzol, there also seems little chance of an immediate increase, though there was some talk of the price being standardized at 2 shillings a gallon by the end of July. The British motorist will therefore come to the conclusion that the disadvantages he derives from using benzol are trifling compared with the benefits he will reap by placing his reliance on this product of his native land.

OVERLAND WINS ROAD RACE

Albuquerque, N. M., July 4—Pounding over the steepest mountain roads in New Mexico and covering a distance of 130 miles in 4 hours 19 minutes 58½ seconds, "Red" Sperry, at the wheel of an Overland roadster, this afternoon won the Albuquerque-Santa Fe road race, the first contest of the kind ever held in the state of New Mexico.

Of the nine starters that were sent away in the morning, only three finished within the time limit. Emblem, driving a Buick, was second, 1 hour 14 minutes behind the victor. J. Caldwell, in a Velie, trailed almost ½ hour astern Emblem for third money.

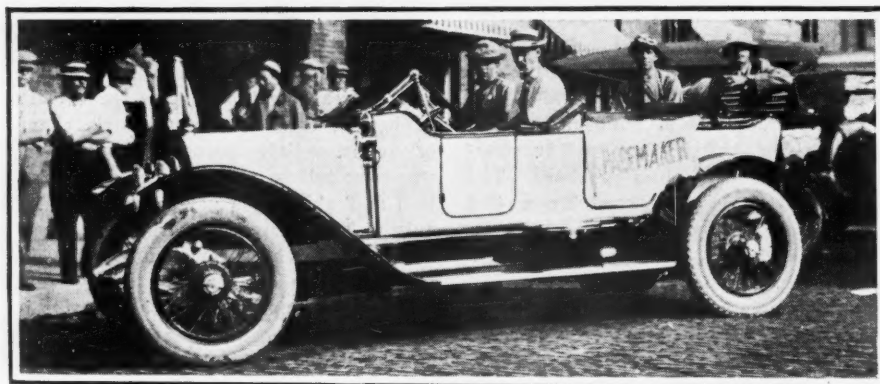
J. Hesch, the Buick driver, suffered the only accident of the race that might be termed serious. While descending La Bajada hill at a speed of 60 miles an hour, his car blew a tire and turned turtle, rolling down the mountain side to be crushed to pieces on the rocks below. Hesch was injured internally, but his mechanic was only slightly bruised.

Hoosier Tourists Now Within Sight of Mighty Rockies

Indianians Pass Through the Middle West



HOOSIERS ENCOUNTER BAD HILL NEAR ALTON, ILL.



RAY McNAMARA IN PREMIER PACEMAKER

ELLIS, Kan., July 8—Special telegram—On their eighth day out of Indianapolis and their seventh running day, the tourists engaged in the Indiana-Pacific tour arrived in Ellis, having completed 1,041 miles of their 3,600 to the coast. The tour is parked tonight in the city park and tents are swung from every one of the twenty cars. This is the first camp that has been pitched by the tourists.

Over Golden Belt Route

The past 2 days the route has been over what is known as the Golden Belt route and the roads, with the exception of a few spots of sand, have been admirable. The roads are gravel for miles in several counties. The crown of the road is good, but the best time was made on the smooth dirt roads that had been dragged last week.

The drive from Junction City Tuesday was one continuous climb, as the altitude here is 2,056 feet, more than 1,000 feet above the last night stop and 1,300 feet above Kansas City.

All the cars are in fine shape and the Rockies will be sighted shortly tomorrow. Thursday night the tour reaches Colorado Springs, Friday and Saturday nights it will be in Denver, and Sunday at 9:30 the real climb begins, the tour reaching the highest elevation on the trip in Berthoud pass Sunday evening.

The outlook for a prosperous sales year for the motor manufacturers in the Kansas territory along the route is very good. The wheat is now being threshed and while the crop is not the best, a good yield is being obtained. The oats crop is very heavy and the corn looks good, although rain is needed now.

Great Enthusiasm Shown

Fewer garages and dealers are being encountered along the route as the tour wends westward, but there is much more enthusiasm than there was manifested by the dealers in Missouri, Illinois and Indiana.

Three points of particular interest were

noted during the day—first at Salina the Indiana tourists on the Golden Belt route crossed the Meridian trail from Minneapolis to Galveston. Later in the day, near Kanopolis, they were midway between the two coasts; at Russell, Bookwalter, Fisher, White and Westgard were invited by the county commissioners to talk good roads.

Pathfinder Still Perfect

The A. A. A. and United States government Pathfinder 40 entry in the Indiana-Pacific run, touring under a sealed bonnet, arrived in Ellis tonight with the Hoosiers. Not a drop of water was put in the radiator during the day, in spite of the fact that it was the hottest day of the year for the dusty travelers. On account of rumors having been circulated that the Pathfinder sealed bonnet run is not bona-fide in every respect, Bruce Daniels, official representative of the Pathfinder company, has offered a reward of \$100 to the mechanic, driver or handcuff king who can break the seal on the Pathfinder hood and replace all four locks on the bonnet just as they were originally placed there by Superintendent of Police Hyland of the Indianapolis police department.

The bonnet is sealed in an original and unusually secure manner. The two straps that are used are bolted to the frame, the lock nuts being located in the channel of the frame. The under pan is bolted to the frame in such a manner that it would be impossible to first secure the lock straps and then fasten the under pan. The magneto is protected from oil and water by a leather cover and carbureter adjustments are made from the dash. The rise in altitude has not affected the running of the car in the least, it is stated.

Tourists Reach Kansas City

Kansas City, Mo., July 6—The Indiana Automobile Manufacturers' Association for 2 days has been showing Missouri on its tour from Indianapolis to the Pacific coast. Incidentally those of the Hoosier caravan who have participated in scores of touring events in the past few years have concluded that Missouri offers wonderful possibilities from a scenic standpoint for motor travel.

The exhibition of enthusiasm, the treatment of the roads, the marking of the route, and the general hospitality have not only equaled the very greatest demonstrations given in previous years, but also to a large extent have exceeded those of the past. Indeed, the tour in the "Show Me" state has brought out points which make the 2 days' trip across it a decided feature and one which the Indiana manufacturers long will remember.

The Hoosier party, consisting of twenty cars and about seventy-five men, has been en route 4½ running days, on their way towards the sunset from the Indiana capi-

tol. They have covered 676 miles, one-sixth of the journey, and have spent a day of rest in this city. Tomorrow morning they leave on their second stage, the run across the Sunflower state to Colorado. Every one of the participating cars rolled into this city yesterday afternoon in the parade, a convincing demonstration of their dependability.

Booming Business

Essentially the tour is a business proposition for the manufacturers who have entered it, consisting of a display of their product in actual service, the widening of trade acquaintanceship and the stimulation of interest among dealers as well as users. Many weeks ago the entrants made their plans for arousing the enthusiasm of their individual representatives and latterly the Hoosier Motor Club organ was sent out to extensive lists along the route. This, together with newspaper reports, has caused the Indiana dealers to be on the lookout for the tour and to line up their prospective purchasers for the opportunity to see the caravan. It is evident that the interest in this kind of a proposition is enormous among the sales representatives because in many instances they have gotten together to entertain the visitors where previously they never had been able to work upon a common basis. All of this has tended to increase prospects.

Consequently the trade conditions through this territory have appeared to be better than ever. This applies to both the agricultural and urban communities. As in the case of the Glidden tours of old, the farmers have stopped their work and have driven miles to the route in order to witness the passing of the cars.

Receptions and Entertainments

From the time that the Indiana delegation left its home city the receptions and entertainments en route have been numerous and hearty. Every evening and two or three times during each day the motorists have been stopped for pleasing diversions, and for talks on the subject of road improvements. Indianapolis, Brazil and Terre Haute were hosts in the Hoosier commonwealth; Decatur, Springfield, Carlinville, Alton and Granite City had made special arrangements in Illinois; St. Louis, Columbia, Boonville and Kansas City did the honors in Missouri. Of special importance was the evening in St. Louis. This staid old city always has had difficulty in organizing anything among its dealers, but headed by Robert E. Lee, the Indiana representatives, assisted by those of cars made elsewhere, entertained royally at the Sunset inn. This beautiful place located on the hills 20 miles from the city proper, was the scene of much gayety on Thursday evening.

Mayor Keil of St. Louis and ex-Mayor Bookwalter of Indianapolis were at their best, and the former presented an American flag in behalf of Governor Major to Tour Chairman W. McK. White of the Marion Motor Car Co. At Springfield on

the previous day Governor Dunne presented an American flag to Pilot Ray McNamara of the Premier company. On the same evening the Springfield dealers took the motorists on special trolley cars to the country club. At Columbia, Mo., the Columbia Club had open house.

On the banks of the Missouri river is the little town of Boonville, named after the famous pioneer and trapper, Daniel Boone. At this point the "Big Muddy" now flows over Old Franklin, the first white settlement made west of the Mississippi in Missouri. Because of its historical interest and the efforts of its good citizens to obtain improved roads, they took great pleasure in the visit of the Indiana motor car manufacturers; they provided free ferrage, light luncheon and refreshments and then sent their touring guests westward.

Kansas City's Greetings

Kansas City has entertained motor tourists before and knew that a tired group of men expecting a rest would wish to be at liberty for a little while. Twenty-eight miles out of the city they were met by Bruening Brothers, local Apperson dealers, and given light refreshments.

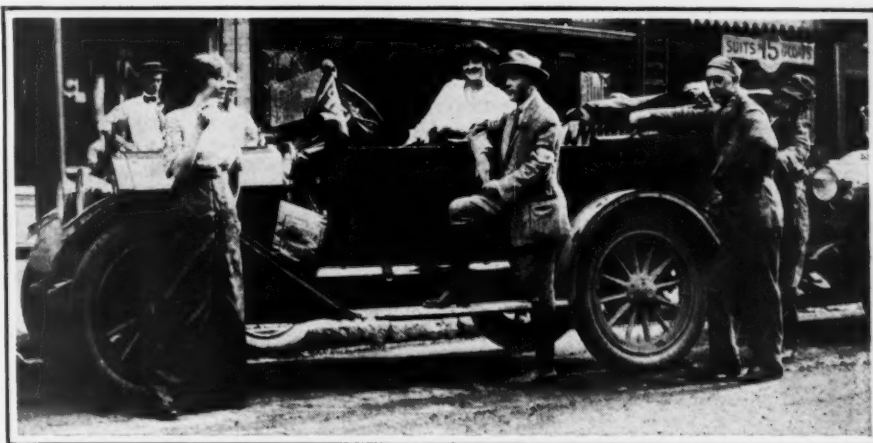
Sunday was open, but at 6:30 Sunday

evening the Kansas City people came to the hotel, took the Hoosiers for a long ride over the city's impressive boulevards and to Electric park for the evening. This was a program much appreciated.

Boosting for Good Roads

The presence of Carl Fisher has vastly increased the importance of the tour to road builders. They have hailed it far and wide and a large amount of actual road work was done. For example, 100 miles of the St. Louis-Kansas City route was dragged and scraped, new culverts put in shape, and everything done to better the roads with the material at hand. From Indianapolis to Terre Haute the party followed the white bands of the Hoosier Motor Club on the poles; black and white banded poles appear along the Alton way from Springfield through Alton to St. Louis; and the red, white and blue bands of the Old Trails Association guided them across Missouri. The next 490 miles of the Golden Belt route, with the exception of the section from here to Topeka, have been specially worked.

The tour is being run upon the lines which proved so successful in the two previous annual tours of the Indiana Automobile Manufacturers' Association.



TOURMASTER W. McK. WHITE AND HIS MARION



TALKING GOOD ROADS TO RESIDENTS OF BRAZIL, IND.



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Preparing for the Tour

NOTHING is more discouraging than a sickly car on a 2-weeks' vacation tour. It robs the owner-driver of all enjoyment and introduces a spirit of uncertainty and suspicion that is most damaging to a vacation spirit. A common trouble is a motor that does not seem to give the usual power. The owner-driver cannot understand why the car does not seem to mount hills with its old-time vigor. The spark has to be retarded on hills that it erstwhile would scarcely notice. Sometimes it is necessary to shift gears when the grade seems ridiculously slight. The general trouble in such times is with carbon in the cylinders. Every person starting on a long tour begins with feeding more oil, the plugs may get fouled and the valves and seats well carbonized.

THERE are several remedies: First of all it is best before beginning a long tour to have the old oil removed from the motor and the interior of the engine well washed out with kerosene or some form of carbon-remover suited for the purpose. This done, add a fresh supply of good oil and do not feed too much. There is often as great danger when feeding too much oil as when feeding too little. If you are traveling on average country roads with hard surface so that averaging 20 miles per hour is not difficult it will not be necessary to feed more oil. If, on the other hand, you have considerable sand roads and have to use second speed, feed more oil. It is necessary.

BE careful and see that the radiator and water-jacket system are well flushed out before starting. If you have used some anti-freeze solutions drain them off, then drain the entire system and attach a hydrant hose and flush out thoroughly until the water emerges perfectly clean. Fill up with clear water and when adding water enroute be fastidious. Use clean vessels and clean water.

IF a car does not perform so well on a trip as on average driving around your home it may be due to the heavier load it has to carry. You must be fair with the motor. Look over your load and see if you have not added a good few extra pounds, perhaps several hundred pounds. If you have added an extra spare casing, extra baggage trunks, extra clothing, extra cans of oil, extra grease, extra tools and a dozen other little extras, then, do not forget that they make the total load on the motor considerably more. It may be because of this be necessary to drop to lower speeds on certain hills, it may be necessary to retard the spark a little, be human with your perhaps overloaded machine.

HOW to use a Blue Book: Everybody thinks he or she knows how, but very few really do. If you are using the Official Blue Book giving you the road directions for your tour keep one thing in mind, namely, keep ahead of the car in reading the directions. It is good advice to read the next direction as soon as you have passed the direction you are following. To explain: If you are at such a reading as, "89.7 miles—turn right at four corners," and the next reading is "90.5 miles—turn left at end of the road." Immediately you have made your right turn, announce to the driver that the next direction is a left turn at the end of the road which is scarcely a mile distant. This

prepares the driver for the turn. He is expecting it, it sets him more at ease.

NOT infrequently when going through a small town of not over 2,000 population it may be necessary to turn right and left half a dozen times, going but a block in each direction before making a turn. It is wisdom to read the directions carefully before reaching the town, so that you have them memorized in advance, otherwise you will scarcely be able to read the direction and keep up with the turns, you will overrun a corner and perhaps get off the route entirely.

ON many roads the turns and corners have few if any landmarks and it is necessary to depend entirely upon the odometer readings. In such trips be sure to check up the odometer readings with the Blue Book mileages as the trip proceeds, perhaps every half hour. At one time you may be as much as $\frac{1}{2}$ mile out, at another time you will have a difference of but 1 tenth mile. Keeping close record on the odometer readings and noting the discrepancies between it and the guide will often prove valuable when turns with few, if any, landmarks are made.

The Leverless Gearshifter

NINETEEN FOURTEEN is holding out bright promises for electric, pneumatic or some other form of leverless gearshifter. Two or three car building companies have already announced such and more announcements will surely follow. At first thought the leverless gearshifter seems a needless thing but a second consideration shows its usefulness. Viewed from the amount of physical work it saves it certainly must be given consideration as an economizer. It takes precedence to the self-starter, because for every time you have to go through the physical work of cranking a motor you may have to shift gears two dozen times. With women drivers this is a prime consideration, because many of them find it almost impossible to master the physical movements, either the reach is too great or the bending movement necessary is interfered with the clothing.

BUT there is yet another side to the leverless gearshifter movement, namely, that it is a good thing for conserving the car mechanisms. It is generally accepted that there is not enough gearshifting done at present. Drivers hate to do it. It lowers their pride, and they think that each gearshift is an indication of poor driving. This may be far from the truth, because often gearshifting is an indication of expert drivemanship. With smaller motors and heavier cars, there is greater need for more gearshifting. Gearshifting will save the motor from useless strain. It may also save many other parts from strain.

THEN how will leverless gearshifting arrangements accomplish anything? They will lead to much more frequent gearshifting because the work can be quickly done and done without an observer on the sidewalk being aware of it. There are not a few cars that are best driven if a gear is changed in turning sharp corners, in fact, acceleration is much better and easier if gears are shifted. The leverless system will be a great aid in such case. Then, too, the leverless system should lead to more frequent shifting on hills, which is highly desirable.

Corona's Circle to Play Important Part in Motor Racing

FANNED by the cooling breezes of the Pacific ocean and lying on the north slope of the foothills of Santa Ana mountains, 15 miles west of Riverside and 50 miles southeast of Los Angeles, is beautiful Corona which will celebrate the anniversary of California's admittance to the union September 9 by playing hostess to the motor speed kings of America and supplying thrills for 100,000 enthusiastic spectators who will witness Corona's first race meet.

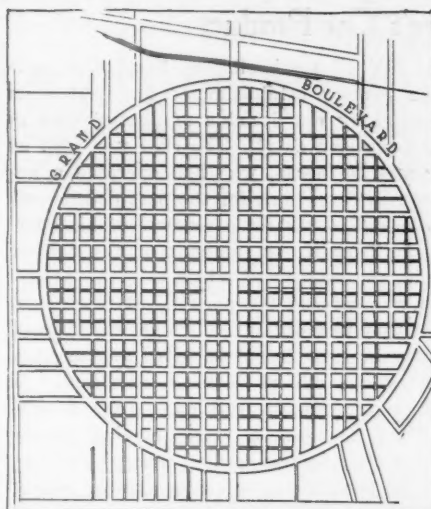
Twenty-seven years ago, Corona was an unchristened colony over which an eastern real estate promoter had control. This modern land baron was not without originality. Snapping his fingers at established custom, he laid out his town site in the form of a perfect circle and planned to convert the boundary of the future city—now known as Grand boulevard—into one of the finest tracks for horse racing in the country.

But before the promoter realized this latter ambition, the horse was forced to surrender to the inevitable motor car and the contemplated track was never built. Corona grew, however. Settlers discovered that the fertile but untitled soil in the vicinity of the crown-shaped colony was particularly adapted for fruit raising. Within a quarter of a century, Corona became the center of the citrus fruit district, shipping more lemons annually than any other point in that region.

Two years ago, when the enterprising residents of Corona became interested in public improvements, a subset of earnest study was, "What can be done for the best interests of the growing city?" There was but one answer. The solution was reached when the citizens looked upon the boundary road of Corona, a perfect circle a trifle over 3 miles in circumference, 70 feet wide from curb to curb, lined on both sides by luxuriant pepper and palm trees and capable of being transformed into a highway of charm and attraction.

Civic and social leaders became interested in the project. It was decided to issue \$86,000 worth of bonds for the purpose of macadamizing Grand boulevard and make it one of the show places of the city. Motor car enthusiasts at once saw the possibilities of such a road for a race course and started an agitation for a celebration that would center the eyes of the country on this little city, a celebration in which the foliage-canopied boulevard should be used as a track on which high-powered racing cars might roar a challenge and where the speed record of famed Santa Monica might be shattered.

The dream of 2 years ago became a reality this spring. A motor club of 600 members was formed to promote such a speed meet, a competent board of directors was elected and Teddy Tetzlaff,



THE CORONA CIRCLE



CORONA ROAD RACING CIRCLE SINCE ITS COMPLETION

Barney Oldfield and prominent motorists of Los Angeles were called in for consultation. Presto! An invisible magician waved his wand and arrangements were completed for one of the most spectacular speed meets ever held on the Pacific coast. Corona motorists and citizens subscribed \$15,000 to cover the initial expenses. 10,000 posters were distributed throughout the state.

Admission day is over 2 months distant, yet the details of the program are practically completed. There will be two races, a light-car event of 100 miles for machines under 231 cubic inches piston displacement which will start at 10 o'clock in the morning and a 300-mile free-for-all in the afternoon. The cash prizes are as follows:

Small Car Race—First, \$1,500; second, \$1,000; third, \$750; fourth, \$500; and fifth, \$300.
Free-for-all—First, \$3,000; second, \$2,000; third, \$1,000; fourth, \$800.

In addition \$1,000 is offered the driver who breaks the present world's road racing record of 78.61 miles an hour established by Tetzlaff at Santa Monica in 1912.

The road, which will be completed by July 15, is being constructed under the direction of O. F. Easley. The bed is of fine macadam 8 inches in depth. On this has been spread a heavy top surface of cement powder, which hardens as it seeps

into the rock. When this is rolled, a light surface of asphaltum is put on. The road has a 6-inch crown and slopes about 3 percent to the center. There is not the slightest deviation from a perfect circle. The road measures 3.16 miles around and the distance from curb to curb is 70 feet. There are no short turns.



CORONA'S CLEVER RACE POSTER

The dedication of Corona's boundary to speed promises to be an unqualified success. The prize money offered, totaling \$15,000, is sufficient to attract America's speed kings to the new course.

When the macadamizing of Grand boulevard is completed next week, California can boast of the most unique course, Corona, as well as the fastest course, Santa Monica, in the country.

Partin and Palmer Combine Forces

Former to Sell Latter's Car Product

CHICAGO, July 7—Latest among the recent developments in centralization of motor car sales is the combination of the Partin Mfg. Co., a large selling organization of Chicago, with the Palmer Motor Car Co., Detroit, Mich. The relation between the Chicago and Detroit concerns is to be identical with that between the manufacturing and selling branches of any well-regulated business.

The Chicago concern will handle the sales of the output of three different factories, and only one model is to be manufactured in each plant. The line to be sold by the Partin company includes the Crown, a cyclecar type car with a four-cylinder 21-horsepower motor listing at \$385, which has been described in these pages; the Partin-Palmer 38, a six-passenger touring car with a 38-horsepower four-cylinder motor design by A. C. Mason, of Flint, Mich.—the car selling at \$975. The third car of the line is the Partin 45, a production with a Rutenber 45-horsepower motor appearing as a six-passenger tourist with electric lighting and cranking system, listing at \$1,275.

The personnel of the new organization includes C. C. Darnell as general sales manager of the Partin concern, of which George H. Partin is the head; Randall A. Palmer, general manager of the Palmer Motor Car Co., and A. C. Mason, president and general manager of the Mason Motor Co.

Mr. Darnell has had charge of the selling end of the Crow Motor Car Co.'s business since its first car was manufactured. Randall A. Palmer organized the Cartecar company, of which he was general manager until about 1 year ago. George H. Partin, who is responsible for the financial health of the Chicago concern, is a business man of Tennessee and the south, and has been financially interested in the motor car business for several years. A. C. Mason was one of the designers of the Buick motors.

Associated with Partin is H. F. Graper, capitalist and banker of Lexington and Nashville, Tenn., and the Partin Mfg. Co. is a co-partnership owned and controlled exclusively by Partin and Graper. In the Detroit company are William H. Lankin, J. H. Pratt and others. William H. Lankin, president of the Palmer Motor Car Co., was a proprietor of one of the largest hardware concerns in Michigan previous to his connection with the Palmer company. J. H. Pratt, the secretary of the Palmer company, is a Michigan banker and is financially interested in several banking institutions.

DECISION HITS GARAGEMEN

New York, July 5—A decision declaring it illegal for a garage to operate within

50 feet of a schoolhouse, theater or moving picture establishment has just been upheld by the decision of Justice Goff in the supreme court. The case was that of James McIntosh, who had operated a garage in New York for the past decade and who had to ask for a renewal of his operating permit. On account of the 50-foot rule, the essence of which is given above, he was refused the permit. It is easy to see that this ordinance, which was framed early in 1912, is apt to drive any number of garages out of business, as all that is needed to achieve this end is for a competitor to open a small moving-picture place close to the garage, and the renewal of the permit will be refused to the latter. The case will be appealed.

NEW GENERAL ELECTRIC CO. CHIEF

Boston, Mass., July 5—President Coffin of the General Electric Co., having retired from a position which he has held since the concern's organization, Edwin W. Rice, Jr., has been elected to fill his place.

ANOTHER FRENCH ROAD RACE

Paris, July 1—Known as the grand prix de France, the 500-mile road race at Le Mans will this year be run on Monday, August 4, under practically the same conditions as the grand prix at Amiens. The course is a triangular one, practically dead level, with perfectly straight roads, passing by the racecourse on which the late Wilbur Wright made his first flights in Europe. Entry already has been received of two Peugeot cars now under preparation for the Amiens race.

PARIS COUNTS ITS HORSES

Paris, June 28—The horse is dying rapidly in Paris. This is proved by the municipal statistics taken carefully every year. Within a period of 14 years the city has lost about 10,000 of its private horse-

drawn vehicles, all these having been replaced by motor cars. The official statistics of the private horse-drawn vehicles in Paris from 1898 to 1912 are as follows:

Year	4-wheel vehicles	2-wheel vehicles	Total horse vehicles
1898.....	11,616	2,118	13,734
1900.....	10,926	2,116	13,042
1902.....	10,013	1,922	11,935
1904.....	8,572	1,769	10,341
1906.....	7,233	1,628	8,861
1908.....	5,871	1,421	7,292
1910.....	4,584	1,171	5,755
1912.....	3,517	1,031	4,548

MORE DYER LICENSES

New York, July 8—The Enterprise Automobile Co. of this city has licensed under the Dyer patents two new companies, namely, the Brown Commercial Car Co., Peru, Ind., and the Crow Motor Car Co., Elkhart, Ind.

TEN YEARS' IMPORTATIONS

Washington, D. C., July 8—In the last 10 years the United States treasury has collected \$10,123,427 in duties upon foreign built motor cars brought into the port of New York. In the period named 8,774 machines of all classes were imported, aggregating \$22,507,615 in appraised foreign value, subject to a duty of 45 per cent. The statistics, prepared at the New York custom house, show that during the last 3 fiscal years, ending June 30, the importation of cars has fallen off. In 1912, for instance, 826 cars were imported, as compared with 1,381 in 1909.

LANSDEN IN THE COURTS

Philadelphia, Pa., July 5—George Padlock, of Newark, N. J., and Martin E. Kern, of Allentown, have been appointed ancillary receivers of the Lansden Co.

The appointments were made on the petition of John B. Wickery, William C. Scott and the Crescent Automobile Co., who allege that the Lansden company is hopelessly insolvent, having receivable accounts of only \$15,000, while the payable accounts amount to \$80,000. It is also charged that a large part of the stock of the concern has been removed from its factory in Newark to Allentown, with a view of delaying and defrauding creditors.

Prest-O-Lite Co. Conducts Test on Speedway

INDIANAPOLIS, IND., July 3—In a fuel economy test conducted yesterday at the speedway by the Prest-O-Lite Co., under the observation of a Motor Age staff representative, it was found that an \$1,100 five-passenger touring car with a 4 by 4½-inch four-cylinder motor equipped with an electric lighting and cranking system of the type in which the motor-generator armature forms the flywheel of the engine, ran 9.3 per cent farther when the generator was not supplying current than when it was charging the battery at a rate of 15 amperes and headlights and taillight were lighted.

The tests consisted of two economy

runs. A special tank was fitted to the dash of the car, the main tank being disconnected; in the special tank was measured 1 gallon of gasoline. The head and taillights were turned on and the car started by the electric cranker and run at a constant speed of 20 miles per hour until the gasoline was exhausted. The mileage reading then was taken on an uncalibrated odometer. The odometer showed 21.4 miles.

As the second test, the first was repeated with all conditions the same except that the wires leading to the regulator were disconnected so that the generator was not supplying current to either

DETROIT, Mich., July 7—Articles of incorporation have been issued by the secretary of state of Michigan to the Lincoln Highway Association, officers and directors have been elected and a permanent organization effected.

With this legal formality disposed of, it is believed that the thoroughfare from coast to coast will now go forward with a rush and great sections will be completed before the opening of the Panama-Pacific exposition in San Francisco in 1915.

The officers elected are: Henry B. Joy, Detroit, president; Carl G. Fisher, Indianapolis, vice-president; A. R. Pardington, New York, vice-president; Emory W. Clark, Detroit, treasurer, and A. R. Pardington, secretary. Including these officers, the executive committee and directors also comprise Paul H. Deming, Cleveland; Russell A. Alger, Detroit; Roy D. Chapin, Detroit; A. Y. Gowen, Cleveland, and F. A. Seiberling, Akron, O.

It was decided to continue the office of the headquarters in the Dime Bank building in this city. The directors authorized the secretary to proceed with the sale of contributor's certificates so as to meet the demand of literally thousands of persons in every section of the United States who have voluntarily offered to assist in an enterprise that is patriotic and non-mercenary. So much enthusiastic interest has been shown on every side by those who will not benefit directly from the Lincoln highway that the plan of issuing contributor's certificates was decided upon.

Carl G. Fisher has turned over to the Lincoln Highway Association all the subscriptions received by him for the original project known as the coast-to-coast highway. A certificate of audit was presented at the meeting here by a well-known Chicago accounting firm showing that the amounts so far pledged are in excess of \$4,200,000. As, up to this time no organized effort has been made to obtain subscriptions, the figure of \$10,000,000 which has been established as necessary to establish the Lincoln highway undoubtedly will be reached in a comparatively short time.

Lincoln Highway Association Launched Transcontinental Scheme Incorporated

None of these pledges will be called for until the total is reached, and then the payments may be made during a period of 3 years, while the actual work of building the highway is in progress.

President Joy, who called the organization committee together on his return from a transcontinental trip to San Francisco over suggested routes, reported that at every point he found the public keenly interested and enthused over the Lincoln highway and offering to give any necessary help that may be required.

State appropriations are encouraging. In several cases the states have agreed to divert certain proportions of their good roads appropriations to those counties lying along the route. In fact, the success which has so far been achieved leaves no doubt in the minds of the officials of the Lincoln Highway Association, which has national headquarters in Detroit, that the project will be an assured fact before long, linking the east and west by a great highway of concrete which will be an artery for traffic of even greater benefit to the country as a whole than will be the Panama canal. And its cost will be many times less.

The state of Illinois has just appropriated \$1,000,000 for betterment of the state's roads, and Governor Dunne has agreed to divert a greater proportion to those counties along the route. The appropriation has been made with the understanding that the counties themselves subscribe an equal amount for the same work, so that the total available is \$2,000,000 in this state alone. In order to aid the counties in their work, the governor is contemplating the sending of a special commission to Detroit to investigate the roads of Wayne county, Michigan, which are many of them examples of their particular kinds of construction.

The state of Ohio has also recently set aside \$1,000,000 more for road work, and through J. B. Marker, highway commis-

sioner, it has been agreed to divert as much of this as necessary to those counties situated along the highway.

E. P. Brinegar, secretary of the Argonaut Trail Committee, San Francisco, was here last week to confer with A. R. Pardington, secretary of the Lincoln Highway Association, as to ways and means of further aiding the project in the far west. The Argonaut trail committee has changed its name to that of the national association.

Announcement was made today of the complete itinerary of Henry B. Joy and Frank H. Trego, who drove from Detroit to San Francisco in the interests of the Lincoln Highway Association. It is as follows:

Detroit	1115.3	North Platte
Ypsilanti	1135.8	Sutherland
Clinton	1148.6	Faxton
Moscow	1161.2	Roscoe Postoffice
Jonesville	1168.6	Ogallala
Quincy	1178.5	Brule Station
Coldwater	1184.0	Mageath
Bronson	1188.7	Big Springs
Sturges	1209.8	Chapell
White Pigeon	1234.1	Lodge Pole
Bristol	1240.6	Sunol
Elkhart	1252.3	Sidney
South Bend	1271.7	Potter's Station
Laporte	1280.2	Dix Station
Valparaiso	1290.4	Kimball
Hobart	1302.4	Bushnell (Rocky Mts. in sight)
Hammond	1346.4	Archer Sta., Wyo.
South Chicago	1355.8	Cheyenne
284.0 Chicago	1374.4	Granite Canyon
321.2 Geneva	1382.7	Buford Sta.
344.7 De Kalb	1396.4	Tie Siding
362.4 Rochelle	1405.3	Red Buttes Sta.
373.5 Ashton	1413.8	Laramie
378.2 Franklin Grove	1455.4	Arlington P. O.
388.2 Dixon	1468.8	Elk Mt. Hotel
401.6 Sterling	1481.8	Fisherville
416.0 Morrison	1502.8	Fort Fred Steele
426.7 Fulton	1511.3	Grenville Sta.
428.3 Clinton, Iowa	1518.2	Rawlins
454.3 Grand Mound	1559.9	Wamsutter
464.3 Wheatland	1569.4	Red Desert Sta.
489.3 Mechanicsville	1576.5	Tipton Sta.
496.2 Lisbon	1604.5	Coal Mine
498.0 Mount Vernon	1605.7	Point of Rocks
510.7 Marion	1617.4	Salt Wells, Wyo.
516.4 Cedar Rapids	1624.3	Baxter
552.4 Pella Plain	1631.6	Rock Springs
559.4 Chelsea	1646.6	Green River
570.7 Tama	1660.1	Bryan Sta.
578.6 Montour	1680.9	Granger
592.4 Marshalltown	1700.3	Linman
615.8 Colo	1716.3	Fort Bridger
622.9 Nevada	1751.5	Evanston
631.2 Ames	1756.2	State Line
647.4 Boone	1761.6	Wassatch, Utah
657.5 Ogden	1769.2	Castle Rock
663.4 Beaver	1785.5	Main Fork
668.4 Grand Junction	1780.0	Coalville
676.4 Jefferson	1833.9	Salt Lake City
686.4 Scranton	1874.4	Grantsville
705.4 Carroll	1888.8	Timpie
719.2 West Side	1904.0	Kanaka Ranch
725.0 Vail	1979.8	Fish Springs
734.2 Denelson	2000.1	Kearney's Ranch
746.4 Arlon	2025.3	Ibapah
753.6 Dunlap	2050.3	Tipte, Nev.
765.2 Woodbine	2079.8	Fort Shellbourne
775.9 Logan	2107.8	McGill
785.4 Missouri Valley	2119.8	Ely
800.7 Crescent City	2151.2	Mooreman's Ranch
808.4 Council Bluffs	2166.9	Eureka
813.2 Omaha, Neb.	2266.0	Austin
829.8 Elkhorn	2312.3	Alpine Postoffice
853.2 Waterloo	2324.9	East Gate
849.0 Fremont	2331.5	Middle Gate
855.9 Ames	2334.8	West Gate
864.2 North Bend	2346.3	Frenchmans Sta.
876.9 Schuyler	2354.3	Sand Springs
897.1 Columbus	2366.1	Saltwell's Ranch
906.5 Duncan	2381.4	Fallon
916.8 Silver Creek	2398.8	Truckee Dam
928.2 Clarks	2416.9	Fernley Postoffice
939.4 Central City	2420.0	Wadsworth
949.8 Chapman	2425.7	Derry
962.4 Grand Island	2435.7	Beno
970.8 Alha	2488.4	Truckee, Cal.
980.3 Wood River	2493.5	Donner Lake
988.9 Shelton	2498.2	Summit
994.9 Gibson	2530.7	Alta
1007.8 Kearney	2546.5	Colfax
1012.8 Frisco-Boston		
Sign 1733		
1017.2 Odessa	2563.7	Anburn
1023.8 Elm Creek	2577.9	Rocklin
1034.1 Overton	2607.5	Sacramento
1038.0 Lexington	2643.0	Todi
1050.3 Cozad	2659.9	Stockton
1061.5 Willow Island	2737.5	Oakland
1066.1 Gothanberg	2743.5	San Francisco

at Indianapolis to Demonstrate Fuel Economy

the battery or the lights. The motor leads were connected to the battery just long enough to start the engine and immediately disconnected. According to the odometer, the car ran 23.6 miles under these conditions.

The lamp load in the first case, included two 16-candlepower headlights and one 4-candlepower rearlight of the ordinary tungsten type. The charging rate averaged 15 amperes, according to an uncalibrated ammeter, beginning at 10 amperes and rising to 16 amperes, the speed of the car varying between 19 and 23 miles per hour. The spark advance lever was at the same point throughout.

Tabulated results are as follows:

With electric load.....	21.4 miles per gallon
Without electric load.....	23.6 miles per gallon
Increase in miles per gallon, due to removal of electric load.....	2.2 per cent
Increase in mileage per gallon due to removal of electric load.....	9.3 per cent

It must be remembered in considering these figures, that the mileage with the electric load would have been greater if the electric installation were designed to supply only the headlights, instead of being designed for lighting five or six lamps and cranking the motor. Also the mileage without the electric load probably would be increased slightly if the car were lightened by the removal of the electric equipment.

France Awaits the Running of Its Grand Prix Road Race

Drivers Practice Fuel Economy at Amiens



FUNERAL OF THE LATE PAUL ZUCCARELLI

PARIS, July 1—Promptly at 5 o'clock on the morning of July 12, the first car will be sent away on the 569-mile fuel consumption race round the Amiens triangle. The leader will be in a six-cylinder Sunbeam. At intervals of half a minute nineteen other cars will follow him. All the race drivers have now been officially appointed and the following list is complete with the exception of the third Peugeot man; no successor has yet been chosen for the late Paul Zuccarelli.

No. of Car	Driver
1—Sunbeam	Chassagne
2—Delage	Bablot
3—Opel	Joerns
4—Mathis	Esers
5—Excelsior	Christlaens
6—Th. Schneider	Croquet
7—Itala	Nazzaro
8—Peugeot	Jules Goux
9—Sunbeam	Darius Resta
10—Delage	Albert Guvot
11—Excelsior	Hornsted
12—Th. Schneider	Gabriel
13—Itala	H. R. Pope
14—Peugeot	Georges Boillot
15—Sunbeam	Gustave Caillols
16—Th. Schneider	Champoiseau
17—Itala	Moriondo
18—Peugeot	Wagner
19—Sunbeam	W. Lee Guinness
20—Th. Schneider	Rene Thomas

On the following day, at 6 a. m., the motorcycle race will be held and in the afternoon the first cyclecar race ever held in Europe. There are thirty-eight competitors in the cyclecar race, and as the course for these machines is only about 11 miles round the starts doubtless will be given in groups of three or four, the specially built road in front of the grand stands being sufficiently wide to line up a number of machines. This arrangement will allow all the machines to get away before the leader finishes his first round.

Rigal Will Not Drive

Victor Rigal, who last year won the 3-liter section of the French grand prix in a Sunbeam car, will be unable to start No. 1 in this year's speed contest. While

training for a hill-climb in Spain about 10 days ago, Rigal's Sunbeam had to take the ditch to avoid another vehicle, with the result that it was overturned, the driver suffering one broken arm and a severe flesh wound on the other.

Rigal had hoped to recover in time to take part in the race on July 12, but this is now out of the question. He has therefore decided to hand over his car to Chassagne, who last year acted as mechanic on the winning Sunbeam and has since been employed on the Sunbeam racing staff. Chassagne has figured in European road races for the last 12 years, having been for a considerable time on the staff of the Bayard-Clement company. He won third place for Hispano-Suiza in the 1910 light-car race at Boulogne, and has had a long experience as a pilot of Bayard-Clement aeroplanes.

Practice on the Course

Official speed trials in view of the grand prix race to be held on the outskirts of Amiens on July 12 have been held this week. The basis of the race is a fuel allowance at the rate of 14.1 miles to the gallon. With such a restriction it is being asked if the cars can attain the same high speeds as the racers which took part in last year's contest at Dieppe, where absolute liberty was granted.

So far as can be judged from these preliminary trials, this year's cars, although considerably smaller than those of a year ago, will be as fast, if not faster than the racers of 1912. The fastest time for one round of the course is 15:12, established by Boillot on Peugeot. As the course measures 19.64 miles, this is at the rate of 77.5 miles an hour. This time was made under rather unfavorable circumstances, for the course was very dusty

and a considerable amount of fog prevailed. Goux, with the second Peugeot, practically equaled Boillot's time on the second day of the trials. Guyot, in a Delage, made 16:12 for one round of the course, standing start; with a flying start his teammate, Bablot, made 16 flat. It is evident that there will be very keen competition between the two Peugeots and the two Delage cars. It is not certain that the Peugeots kept within the fuel allowance, but the Delage cars kept below the quantity of fuel allowed throughout their tests.

Sunbeams on the Course

All four Sunbeams were on the course, but did not make very fast time. The fastest work in this team was done by Chassagne, who has been selected to replace Victor Rigal, in 16:25. On the second day all four cars went round in practically 17 minutes, thus showing remarkable regularity but being too slow to hope to successfully compete against the Peugeots and Delage unless they are keeping power in reserve. It is understood, however, that the six-cylinder Sunbeams made use of the whole of their gasoline to attain these times. Schneider, Itala, Excelsior, Opel and Mathis have not yet put in an appearance on the course, and as the roads are now closed for practice work, it looks as if they will have to start in the race without having been round to test their fuel consumption.

Even among the drivers who have taken full advantage of the days set apart for practicing there is a considerable amount of dissatisfaction at the small amount of time allowed for training on the course. Competition is likely to be so severe that no maker can afford to run with a certain amount of gasoline in reserve. The winning car will doubtless finish with not more than half a pint of gasoline in the tank. But in seeking to gain every possible ounce of power there is a possibility of overshooting the mark and being left stranded before the finish with an empty tank. To avoid this the drivers are all clamoring for permission to use the course for practicing. The power to grant this lies with the local authorities, who are so afraid of accidents that they hesitate to open the roads without the presence of troops.

The Sunbeam people were so dissatisfied with the opportunities that have been given them for training that there has been some talk of withdrawing from the race. Five other firms are in a worse condition, for they received intimation that the course was open for practice too late to bring their racing cars, and, unless a change is made, will have to start in the race with only a vague knowledge of what their motors consume on this set of roads.

One of the features of the practicing was the work on the special concrete surfaced banked track in front of the grand stands. This road is a little more than 200 yards in length and unites the two main legs of the course. It has the grand stands on the outside and the tire pits on the inside. The track is slightly banked and is sufficiently wide for cars to be standing opposite the pits on the straight portion while others are going by at speed.

Boillot set the pace over this track at an average of 40 miles an hour, but before the trials had come to a close most of the drivers were going by at 50 miles an hour. The general way in which to take this turn is on low gear. Most of the cars approach the grand stand track on third speed, for there is a slight rise from the railway bridge a kilometer away. Just as they enter the turn they change to second, and on leaving the track get into third, to slip into top 300 yards further on. This was the method adopted by Boillot, Goux and Guyot, who did the fastest work. On the second day of the trials the Sunbeam men adopted a different tactic, slowing down, and going round the track on top gear. With this plan they were much slower than the cars using their gears.

Sunbeam has fixed up its racing headquarters at Moreuil chateau, the foundations of which were laid in the twelfth century. The place has played an important role in the national wars and revolutions, and for a time was the property of the pope, from whom it was confiscated under a law that no foreign sovereign can hold property in France. The garages and workshops are by the side of an old donjon, the cells in which are perfectly preserved and where can still be seen the deep wells with knives projecting from the walls down which condemned prisoners were cast.

Sunbeam Picks Good Drivers

The Sunbeam race drivers are Gustave Caillois, Darius Resta, Kenelm Lee Guinness, brother of the owner of the famous 200-horsepower Darracq, and A. Chassagne. Last year's winner, Victor Rigal, who was to have started No. 1 in the race, received injuries while practicing in Spain a short time ago and has had to give up his place to his mechanic, Chassagne.

There is a possibility that the third Peugeot will not start in the race. In the accident which cost Paul Zuccarelli his life the racing car was totally destroyed, but there is a reserve car which could have been got ready. It was proposed that it should be entrusted to Louis Wagner, but up to the present no definite arrangement has been arrived at, and the probabilities are that only two Peugeots, driven by Boillot and Goux, will start. Itala has decided to replace the late Guido Bigio by H. Pope, the London agent for these cars.

The funeral services of the late Paul Zuccarelli, the Peugeot race driver, killed while practicing for the French grand prix, was celebrated at St. Ferdinand des

Ternes, June 23. Several hundred persons, comprising some of the most influential figures in the French motor trade were present at the ceremony, and masses of wreaths were sent by admirers and friends. The chief mourners were the mother and brother of the deceased and his companions, Jules Goux and Georges Boillot. The interment will take place at Brescia, Italy, the home town of the deceased.

Zuccarelli's Accident Described

A farm wagon driven by a deaf man and suddenly emerging from a side road, was responsible for the accident which resulted in the death of Zuccarelli, and serious injuries to his mechanic, Ernest Fanelli. Immediately after returning from Indianapolis, Zuccarelli took over the Peugeot racer which he was to have driven in the coming French grand prix. He had traveled out to Nonancourt, 50 miles to the west of Paris, in order to carry out some speed tests on 12 miles dead straight stretch of road between Nonancourt and Evereux. The road is an ideal one for such purposes, being dead straight for 12 miles, practically level, of good width, and having few trees on each side. When traveling at high speed, Zuccarelli suddenly found the road blocked by a farm wagon having emerged from a side road. A slight rise partially hides this by-road and it is further hidden at the present season by tall standing corn. Although the secondary road is parallel with the main road for a short distance, the driver of the wagon had not heard the racing car.

The collision cut the horse and the shafts away from the wagon, Zuccarelli was torn from his seat and killed on the spot, the base of his skull being fractured, while Fanelli was thrown on the road where he suffered a broken arm and severe flesh wounds. The driver of the wagon was only shaken.

Paul Zuccarelli was born in Brescia, Northern Italy, 26 years ago. His father, who was

an artist, wished him to follow the same profession, but the son displayed a decided preference for mechanics. He was trained in the Brescia technical schools and after working in one of the Italian car factories entered the Hispano-Suiza establishment at Barcelona. His first important road race was the voiturette event at Boulogne, in 1910, when he finished first, with Goux second and Boillot fourth. Soon after this race Zuccarelli joined the Peugeot racing team. In last year's grand prix he drove one of the big Peugeots, but had trouble on the first day. In the Le Mans race, in the fall, he handled one of the 3-liter Peugeots and finished first. Zuccarelli was more than a race driver. In conjunction with Boillot and Engineer Henry he was largely responsible for the design of the successful racing cars produced by Peugeot during the last 3 years.

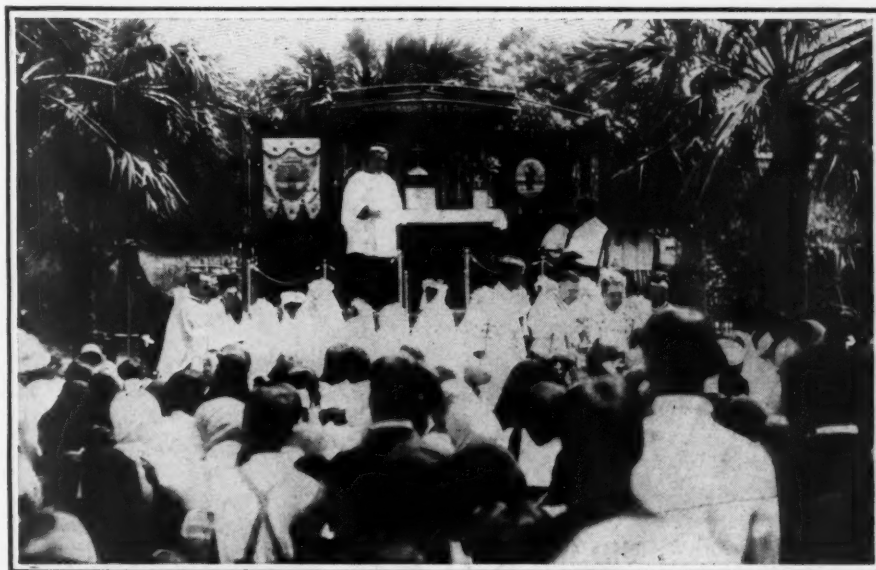
MOTOR CHURCH ON TEXAS TRIP.

New York, July 5--Advices from Brownsville, Texas, tell of the initial services held in that city by priests aboard the motor chapel St. Peter, the only motor church in America, which is on a 2 years trip through Texas in a movement to carry the gospel to sparsely settled regions.

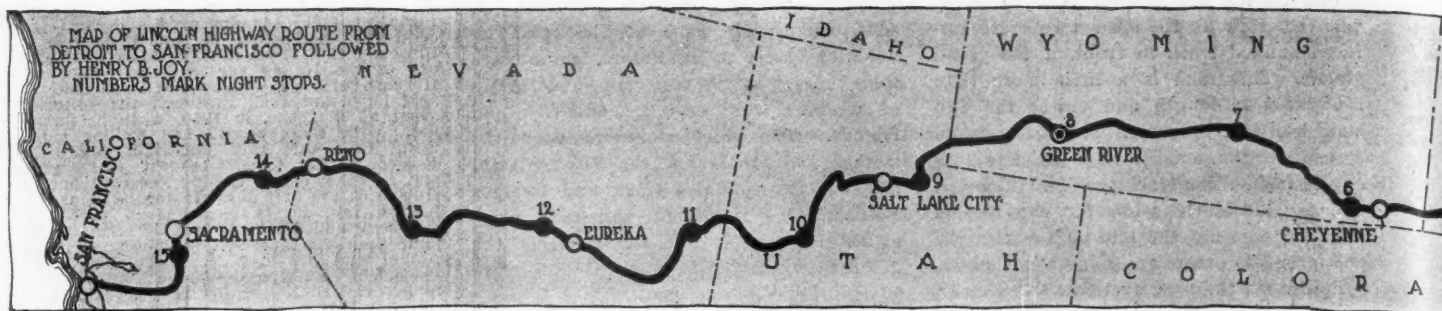
From a radius of 50 miles members of the church gathered to participate in these unique outdoor exercises under auspices of the Catholic Church Extension Society, which has pressed the motor chapel into service to supplement the missionary work now being done with railroad chapels.

On the initial monthly trip, the chapel will be in charge of Rev. Emanuel B. Ledvina of Chicago, vice-president and general secretary of the Catholic Church Society, who designed the body; the Very Rev. H. F. Constantineau of San Antonio, provincial of the Oblate Fathers, and Father Yves Tymen of Roma, Star County, Texas, who is chaplain of the motor chapel. As new missions are reached by the car, the personnel of those in charge will change.

The motor chapel is fitted on a 3½-ton Alco chassis, and can be converted into a church by opening the rear and sides. When traveling, it serves as a living room for the priests who are in charge. So equipped is the chapel, a complete cathedral service can be held.



MOTOR CHAPEL NOW TOURING IN TEXAS



Along the Proposed



WHEN savage redskins rode the plains and the clumsy prairie schooner was the popular means of transportation, a journey from Detroit to San Francisco was a hardship raised to the nth power and squared. The days of '49, however, are now only a memory, the descendant of the hostile Sioux is a star half-back on the Carlisle eleven and the prairie schooner is a historic relic. With the perfection of the motor car and the successful campaign for good roads, a tour from the metropolis of Michigan to the Pacific coast is no longer perilous or fatiguing. It is a legitimate joyride of 2,750 miles and a trifle over 2 weeks in duration.

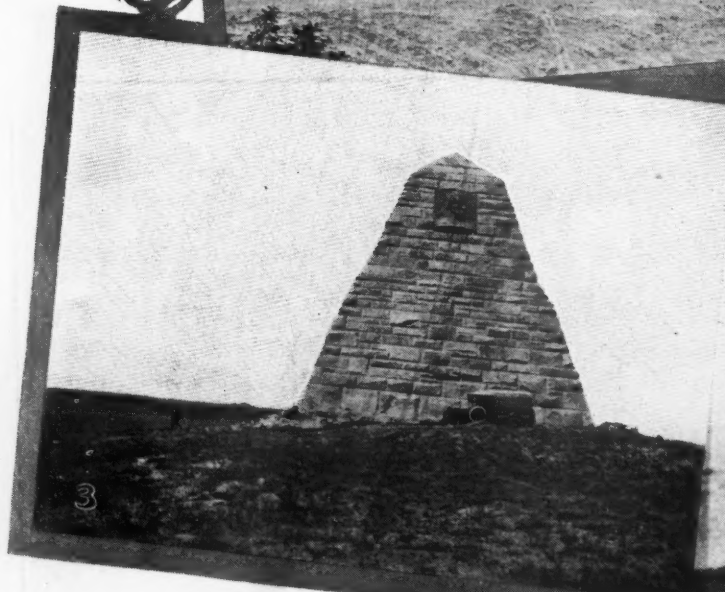
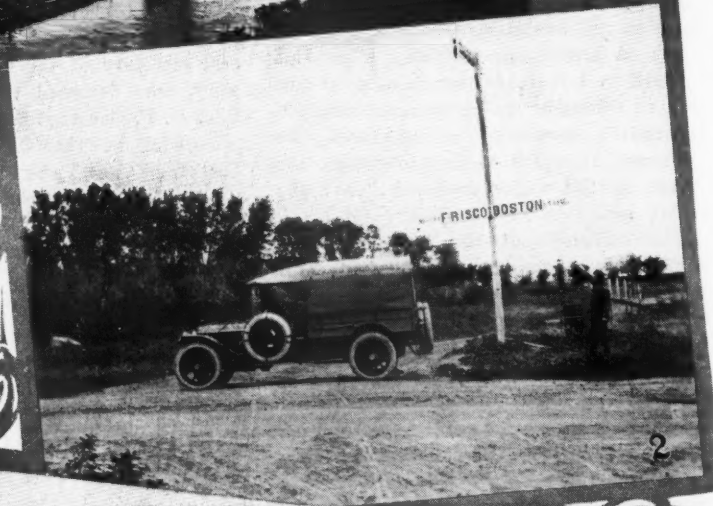
This was conclusively proven by Henry B. Joy, president, and Frank H. Trego, research engineer, of the Packard Motor Car Co., who recently completed their survey of the contemplated route for the Lincoln highway, a transcontinental route of macadam

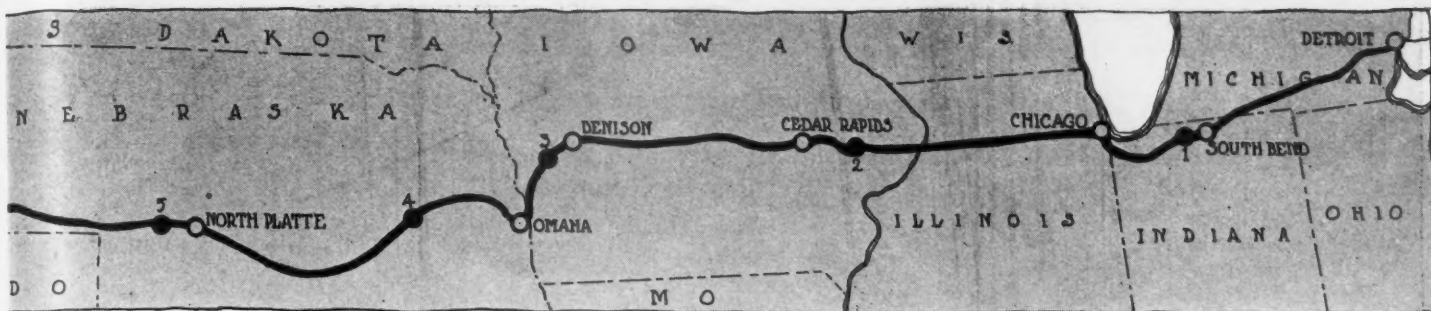
1—Crossing the Mississippi at Clinton, Ia., 144.3 miles directly west of Chicago.

2—The transcontinental halfway sign at a point 5 miles west of Kearney, Neb., from which San Francisco and Boston are equidistant, 1733 miles.

3—Monument to the Ames brothers, who promoted the Union Pacific railroad.

4—The Packard car used on the trip. President Joy demonstrating his ability as a sign painter.





Lincoln Highway

from the Atlantic to the Pacific ocean, which the promoters hope to have completed in 2 years from now, when the Panama-Pacific exposition will be a magnet to draw eastern motorists across the continent.

That the tour from Detroit to San Francisco, as taken by the surveying party, is one of extreme interest to historian and nature-lover is evidenced by a glance at the accompanying illustrations, taken by the pathfinders on their transcontinental journey.

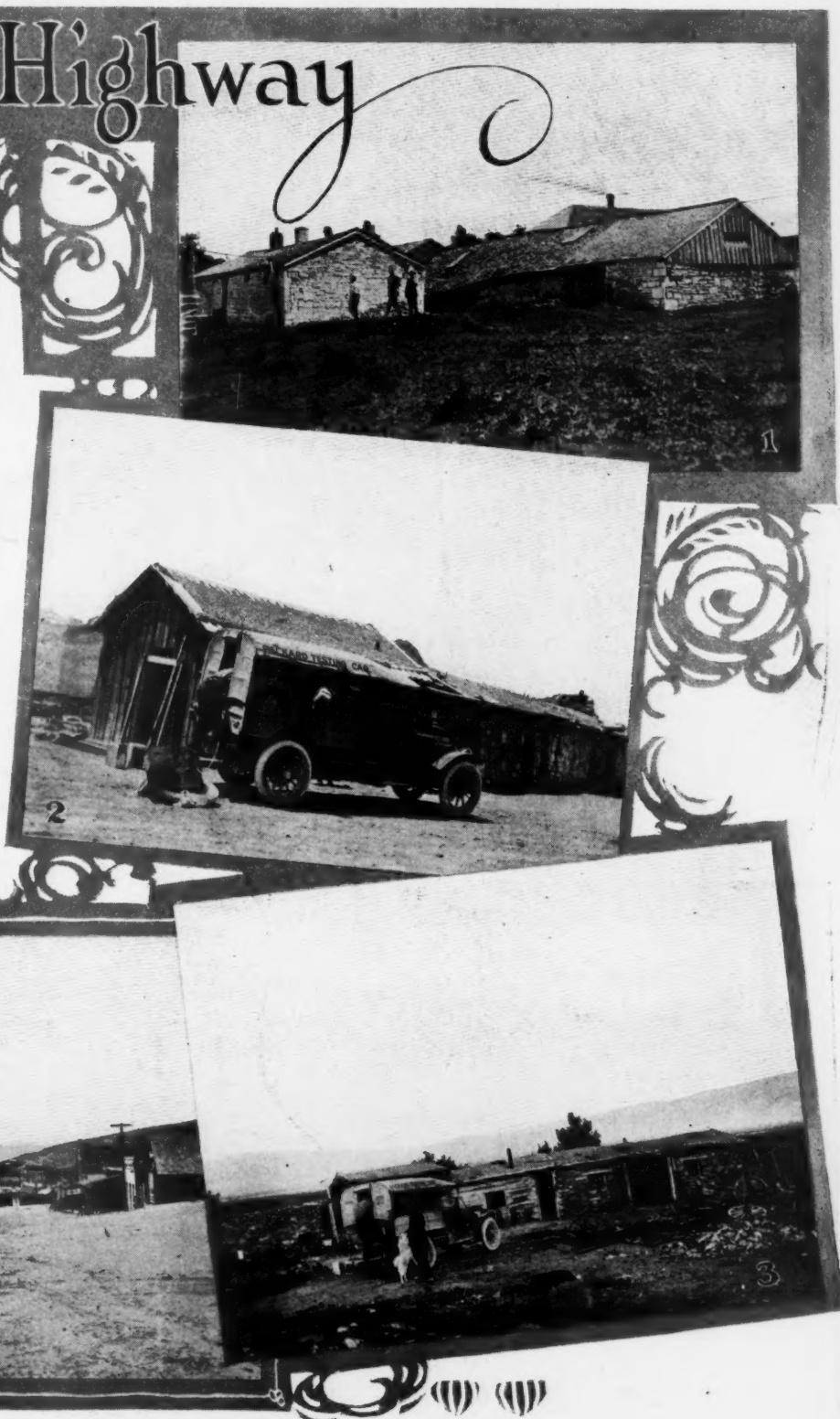
In their drive across nine states the trail-blazers covered a territory overhung with the mist of romance and visited places of historic prominence several times a day. They crossed reclaimed prairie land where once the lumbering buffalo roamed, climbed majestic mountains and penetrated wastes of sands where only the hardy cactus can survive. The scenic beauties of the trip are countless and unsurpassed.

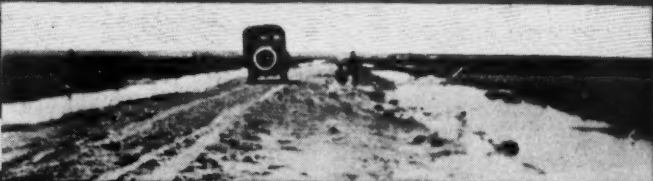
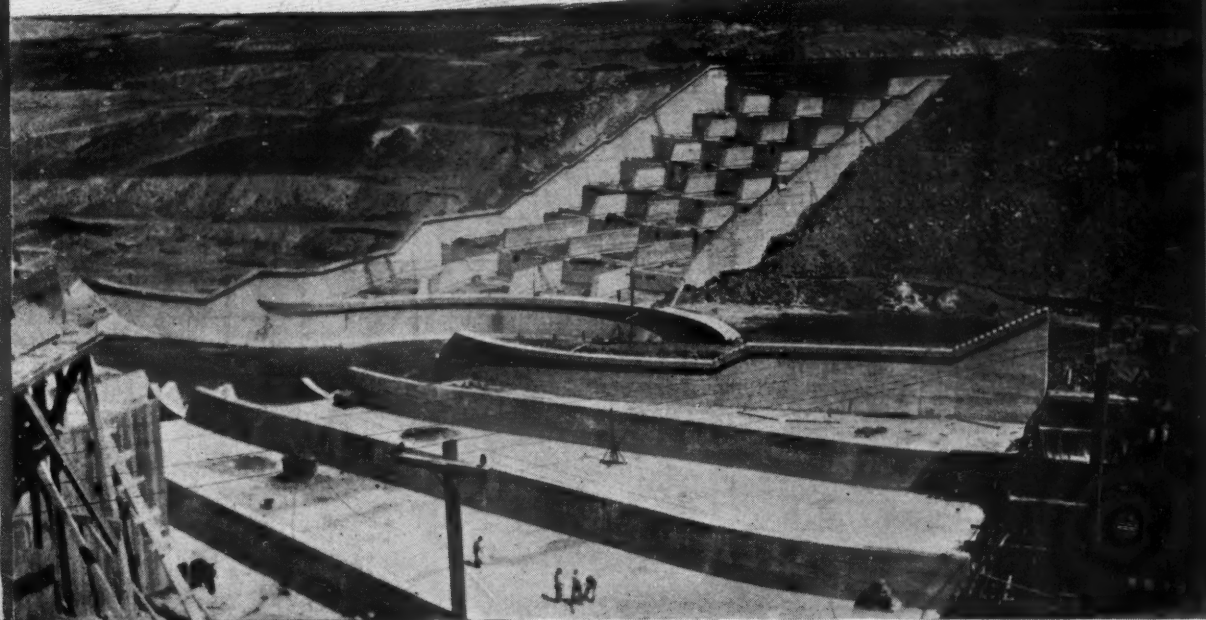
1—Ruins of old Fort Bridger, Wyo., built by General Johnson when his small army marched against the Mormons in 1847.

2—Taking on gasoline at Fish Springs, 1979 miles from the motor car metropolis, Detroit.

3—Tippet, one of the first towns in Nevada to be entered by the tourists.

4—Austin, Nev., a small settlement 2266 miles from Detroit.





- 1—Concrete spillways to be seen at the Truckee Dam, Nevada.
- 2—Five-ton bucket on aerial tramway, Truckee Dam.
- 3—Looking back across the great salt flat toward Sand Springs.
- 4—Road raised up out of the mud flat on Elk Mountain, northwest of Laramie, Wyo.
- 5—Freighter passing camp near Frenchman's Station, Nev.



1—A view of Elk mountain from the north road.

2—A stop for water in Granite canyon, Wyo.

3—Camp in the Sierra Nevada mountains near Truckee, Cal.

4—Looking back along the mountains to Wadsworth, Nev.

5—A view of San Francisco and the Golden Gate from a ferry boat.

Routes and ...



Views in southwest—Upper illustration, Vierra Blanca from Little Eagle valley. Center illustration, Caviland canyon near cave of "Billy the Kid." Lower illustration, Ruidoso river near Minter ranch at Roswell, N. M.

ATTORNEY Frank F. Jennings, accompanied by Mrs. Jennings, their 5 year old son, Frank, Jr., and a chauffeur, left Estancia, N. M., October 15, for a motor trip to Oklahoma City. It was late in the afternoon before the start was made and the Harvey house, at Vaughn, N. M., 80 miles southeast, was the first night's stopping place. From Vaughn to Roswell, N. M., 110 miles, there is a motor toll road with a half-way house where water, oil and gas and a good dinner may be obtained.

After leaving Vaughn, the tourist must bear in mind that water and gasoline are not to be had except at the half-way house until within the vicinity of Roswell.

Driving only about 25 miles an hour, the Pecos valley town was reached at 2 o'clock the afternoon of the 16th. The remainder of the day was spent seeing the famous Pecos valley artesian wells, apple orchards and bottomless lakes. A word must be said of the enterprise of the Chavez county citizens in making passable the 25 miles of the heretofore practically impassable Mescalero sands road. With the exception of a few patches this stretch of sand road has been covered with clay and made into a splendid drive.

Leaving Roswell about 1 o'clock the morning of the 17th, Judge W. E. Rogers piloted the party to the Pecos bridge, 12 miles. The day's log was to Plains, Texas, 110 miles, going through Mescalero pass, by Four Lakes ranch, with its beautiful weeping willow trees, Tatum and Broncho. From Plains to Plainview is a long day's drive of about 180 miles. The itinerary is, Plains to Gomez, Brownfield, motor road, toll \$1, to Lubbock, Plainview, Texas. Here the party was joined by the Humphreys, of Wichita, Kan., touring in their Buick 40. The two cars left Plainview, together going to Amarilla, Tex., for the fifth day's drive.

The wayside towns are Happy, Tullia and Canyon City.

The sixth day's drive through Memphis to Wellington, Tex., tested the ability of the drivers and the endurance of the party. From the beautiful panhandle roads where sometimes for a diversion the cars were driven 40 miles an hour over the buffalo grass, onto the lower hill roads was a considerable change. There is a motor road from Memphis to Wellington that takes the tourist over as rugged a country as could be imagined. That the 40 miles between the two towns has been made passable by motor cars speaks well for the enterprise of the motorists of that section. The week-end took the travel-

Touring Information

ers into the town of Cordell, Okla. That seventh day's log via Mangum, Granite and Hobart was the really adventurous day of the trip. The main road leading into Mangum is a circuitous one, winding upon a cap rock and then descending into the town. There are many sharp turns and steep grades coming down the big hill. A driver trying out a new car was just ahead of the party. Going around a sharp turn he met a wagon. There was only one thing to be done, push the wagon over the 200-foot cliff, or jam the car into the solid rock wall. The driver jammed his car, and was caught behind the steering wheel. He was injured internally as well as receiving broken bones.

From Cordell to Oklahoma City, the journey's end for the Jennings party, and to Kingfisher for the night for the Humphreys finished 8 days driving, during which the Studebaker covered approximately 1,200 miles. The treacherous Canadian river was easily forded at Bridgeport, at what is known as the lower ford.

Leaving Oklahoma City the morning of November 15, the Jennings party made the return trip in 1 day less than the going schedule, going back a much better route. The log was Oklahoma City to Anadarko, the first day, crossing the South Canadian at Washington crossing, where there is a good bridge. An easy drive to Wichita Falls, Tex., was made the second day. Vernon, Electra, Crowell was the order into Paducah for third night. After leaving this town gasoline will be 30 cents per gallon and oil \$1. From here to Matador there is a fairly good motor road, crossing the Tongue river, and a splendid route out of this town takes the tourist upon the plains. This route is much like the celebrated Colorado Sky-line drive, with hills to be climbed instead of mountains.

A norther swooping down on the travelers, the day's journey was finished early in the afternoon at Floydada. Starting bright and early, going through Lubbock, the tourists were back again at Plains, Tex., for the sixth day's end. It would have been an easy drive into Roswell the next day but for the heavy rains in the Pecos valley, that made the use of chains and careful driving necessary to prevent the car from sticking in the mud.

The 180 miles from Roswell back home again was driven in 1 day, the travelers much refreshed in mind and body by the long 2,500-mile trip. Tires were changed only three times, once on the going trip and twice coming home.



Views in the southwest—Upper illustration, near Lincoln, N. M., with El Capitan in distance. Center illustration, Ruidoso valley, near Rafael Sanchez ranch, Roswell, N. M. Lower illustration, Gaviland's canyon, near White's ranch, Roswell.

Answers to Route Inquiries from Motor Age Readers

Edwardsville-Petoskey, Mich.

EDWARDSVILLE, ILL.—Editor Motor Age—I would like to make a trip to Petoskey, Mich., the first part of August and would like to have a route from Edwardsville. Would also like to know the distance and what kind of roads will be encountered, how the roads would be affected by rains and where I could get a map showing route or a part of the same.—Gyle Bros.

You can come almost directly north from Edwardsville to Springfield, 82 m., via Staunton and Litchfield. From Springfield go to Champaign, 103 m., via Decatur, Maroa and Monticello; Champaign to Lafayette, 92 m., via Danville, Covington and Attica; as far as Danville this route is, with the exception of a few miles in the vicinity of Decatur, almost all an absolute dirt road, although some parts of it are being dragged regularly.

From Lafayette you will have gravel and stone roads in fairly good shape all the way to South Bend, 113 m., via Delphi, Deer Creek and Logansport; from this point, almost straight north on the old Michigan road through Rochester and Plymouth. The last 20 m. into South Bend are liable to be badly worn with a number of rough places.

South Bend to Grand Rapids, 117 m., via Niles, Decatur, Kalamazoo, Plainwell and Wayland. This latter is a fairly good road, mostly gravel, with the exception of a few miles between Niles and Decatur. There are two or three ways from Grand Rapids to Petoskey, all through Traverse City, but from latest information the following seems to be the best with very little sand, a lot of good gravel and some macadam:

Grand Rapids to Cadillac, 129 m., via Rockford, Greenville, Lake View, Remus and Evart; Cadillac to Traverse City, 53 m., via Manton, Sherman and Wexford; Traverse City to Petoskey, 70 m., via Torch Lake, Eastport and Charlevoix.

Volume 4, Blue Book, will give you detailed directions on this route.

Ottawa, Ill.-Larned, Kan.

OTTAWA, ILL.—Editor Motor Age—Will you kindly give in an early issue of Motor Age outline of best route to Larned, Kans., and best route books for the trip?—L. W. Hess.

It is possible for you to go either across Iowa or Missouri. We believe the latter will be a little shorter and with the present road improvement in Missouri nearly as good road conditions. You will find natural dirt roads practically all the way, with a few stretches of macadam in Missouri and especially in Kansas well dragged roads.

Ottawa to Bloomington, 78 m., via Streator, Minonk and El Paso. Bloomington to Springfield, 76 m., via McLean, Lincoln and Elkhart. Springfield to St. Louis over the Alton Way, 117 m., going through Auburn, Carlinville, Medora, Alton and Granite, crossing the Mississippi River on the new McKinley bridge into St. Louis.

St. Louis to Columbia, 141 m., via St. Charles, Warrenton, New Florence and Fulton. This is over what is known as the Old Boon's Lick road and is a section of the first road adopted by the state officials as the one to receive improvement as a state highway between St. Louis and Kansas City. Columbia to Kansas City, 159 m., via Franklin, Boonville, Marshall, Lexington and Independence.

From Kansas City you can follow the new Santa Fe trail all the way to Larned on excellent dirt roads. Kansas City to Emporia, 134 m., via Olathe, Gardner, Ottawa and Waverly. Emporia to Hutchinson, 123 m., via Cottonwood Falls, Florence, Peabody and Newton. Hutchinson to Larned, 91 m., via Sterling, Lyons, Ellinwood and Great Bend.

You will find complete detailed road directions given on this trip in Volume 5 of the Blue Book.

Buffalo-Saratoga Springs

STAMPS, ARK.—Editor Motor Age—I will ship my car to Buffalo, N. Y., and from there motor to Saratoga Springs and over the state of New York. Would like to have route map for the purpose. No. 4 and No. 5 Blue Book do not give the route farther east than Buffalo. Also information in regard to license required in the state for visiting cars. I want to stay about a month.—J. G. Wagner.

If you will refer to Motor Age, issue of June 26th, page 25, you will find the latest report on road conditions between Buffalo and Albany. If you are going to Saratoga Springs you can leave the Albany route at Amsterdam, going direct to Saratoga Springs, 28 m., via Ballston Spa. Blue Book Volume 1 gives this complete route.

The New York State ruling for tourists

is that they are exempt if the home state grants reciprocity and your home state numbers are properly displayed front and rear. The latest information we have on Arkansas is that non-residents are exempt in your state, so that you should have no difficulty in New York if you are only going to be there a month.

Madison, Wis.-Kingston, Ont.-Chicago, Ill.

MADISON, WIS.—Editor Motor Age—Kindly give the best route from Madison, taking in the following points: Milwaukee, by ferry across Lake Michigan, Woodstock, Ont., Petersburg, Ont., Utica, N. Y., Buffalo and Chicago; also please state the approximate cost on the ferry for a Ford touring car and whether the gasoline has to be emptied before going on the ferry.—A. J. Marshall.

You will probably go to Milwaukee via Oconomowoc, 81 m.

Between Milwaukee and Grand Haven the Crosby Transportation Co. operates a boat and the charge will be from \$7.00 to \$10.00 for your car. You will be required to empty the gasoline before putting your car on the boat. We understand that this boat leaves Milwaukee at 9 o'clock each night, although you would have to load your car on probably by 5 or 6 o'clock.

Grand Haven to Grand Rapids is 31 m. The road is fairly good gravel with a little clay. Grand Rapids to Detroit, 149 m., via Lake Odessa, Lansing and Powell, is a little sand, but not bad at any time; the last 20 m. is mostly concrete pavement.

See routing given the Lafayette, Ind., inquiry for mileage from Detroit to Hamilton, also for information on customs and your Ontario license.

Hamilton to Toronto, 47 m. via Freeman, Oakville and Cooksville, is mostly improved roads, although there are one or two rough stretches on the grades. Toronto to Port Hope, 64 m., is mostly good roads, some heavy stretches with a few water bars, following quite closely the shore of Lake Ontario through Whitby, Bowmanville and port Hope.

For Petersburg you go north from Port Hope through Perrytown, Mill Brook and Frazier about 40 m.

Returning we believe it will be advisable to come back to Port Hope unless you find there is a better road direct to Cobourg. At this point you would pick up the through route again for Kingston, which is 94 m. from Cobourg.

At Kingston you will find good ferry facilities across the St. Lawrence river to Clayton. Boats run on Tuesday, Wednesday, Friday and Saturday, leaving Kingston at 5:30 p. m. Charges for your car will be about \$10.00.

From Clayton go down to Watertown through Depauville and Perch river. From Watertown go to Utica, 93 m. via Carthage, Lowville, Turin and Rome, and from Utica to Chicago your route is along the main line of travel previously outlined in Motor Age. To Syracuse 49 m., Rochester 97 m., Buffalo 76 m., Cleveland 190 m., Toledo 121 m., South Bend 164 m., Chicago 100 m.

Lafayette, Ind.-Niagara Falls, N. Y.

LAfAYETTE, IND.—Editor Motor Age—I am planning a trip to Niagara Falls, via Ft. Wayne, Detroit, London, Can., and returning via Cleveland, Columbus, Indianapolis, to Lafayette. What is the condition of roads, especially through Michigan and Canada? Is there a better route to suggest?—A. P. Sheehan.

The trip you have mapped out is not only feasible, but a very good one, with improved roads practically all the way. The only part of your trip where you will not find good gravel or macadam is between Ft. Wayne and Detroit from Napoleon to Ypsilanti. This is not bad, however, except for one stretch of clay during wet weather nearing Adrian. Crossing from Canada you will require an Ontario license and also go through the formalities enforced by the customs officials. Both your Ontario license and bond can be taken care of by J. M.

Duck, customs broker, Windsor, Ont., if you care to take care of it in advance. Of course he charges a fee for handling them for you.

An outline of your route with mileage would be LaFayette to Ft. Wayne, 133 m., via Logansport, Peru and Huntington. Ft. Wayne to Detroit, 172 m., via Defiance, Napoleon, Wauseon, Adrian and Ypsilanti. Detroit to London, Ont., 142 m., via Leamington, Blenheim and Rodney. London to Hamilton, 70 m., via Ingersoll and Brantford. Hamilton to Niagara Falls, 51 m., via Grimsby and St. Catharines. Niagara Falls to Buffalo, on new boulevard, 22 m.

If you are unfamiliar with travel in Canada it might be well to remember that they are very strict there about observing the rule that all motorists must use extreme caution in passing horse drawn vehicles.

You will find the trip from Detroit to Niagara Falls very interesting with good roads.

Returning Buffalo to Cleveland, 190 m., via Fredonia, Westfield, Erie, Conneaut and Ashtabula, good gravel roads with considerable macadam all the way.

From Cleveland you can go to LaFayette by way of Columbus, 171 m., and then to Indianapolis, 176 m., or a shorter way, if you prefer it, would be to go from Cleveland to Lima, 161 m., via Norwalk, Clyde, Tiffin, Fostoria and Findlay and from Lima to LaFayette direct, 165 m., via Mercer, Petroleum, Marian, Kokomo and Burlington.

A Blue Book guide in Volume 4, which gives running directions, will be very useful.

Des Moines, Ia.-Hayward, Wis.

ST. CHARLES, IA.—Editor Motor Age—Please give best route from Des Moines to Hayward, Wis.—J. L. Stayton.

Would advise your going almost straight north to St. Paul. You will have for the most part good dirt roads unless you encounter rainy weather, but in Minnesota you will find considerable gravel.

Des Moines to Mason City, 133 m., via Ames, Iowa Falls and Hampton; Mason City to St. Paul, 141 m., via Northwood, Albert Lea, Owatonna and Faribault; from St. Paul go slightly southeast to Hudson, 19 m. At Hudson you cross the Mississippi river on a new bridge and go northwest to Almena, 61 m., on a fair-to-good clay dirt road through Boardman, New Richmond, Richardson, Clayton and Turtle Lake. At Almena go north to Shell Lake, 30 m., via Cumberland and Barronett. Hayward is 36 m. northeast of Shell Lake, and you go via Spooner, Earl and Spring Brook.

For complete running directions use Volumes 5 and 4, Blue Book.

Lawrenceville, Ill.-White Mts.

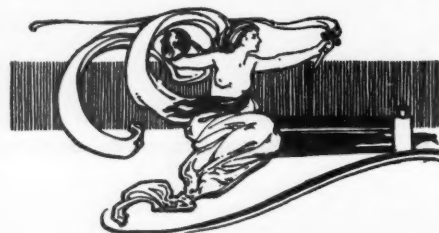
LAWRENCEVILLE, ILL.—Editor Motor Age—Please give me the best route from here to Warren, Pa., and from there to Elmira, N. Y., Delaware Water Gap, White Mountains and Lake Champlain, and return to Lawrenceville.—H. H. Johnson.

On your trip you will find very good gravel roads practically all the way as far as Erie, Pa., the only possible exception being a very few short stretches between Lima and Erie. During the summer months, however, these cause no trouble whatever. Would advise the following route:

Vincennes to Terre Haute, 63 m., via Oaktown and Sullivan; Terre Haute to Indianapolis, 70 m., via Brazil on the National road; Indianapolis to Lima, 162 m., via Pendleton, Anderson, Muncie, Portland and Celina; Lima to Cleveland, 161 m., via Findlay, Fostoria, Tiffin, Clyde, Bellevue and Norwalk; Cleveland to Erie, 101 m., via Painesville, Ashtabula and Conneaut.

From Erie to Delaware Water Gap via Warren, you will be on natural dirt and gravel roads the greater part of the distance through a hilly and rather mountainous country, but very scenic. During the touring season these roads are for the most part in excellent condition unless you run into some heavy rains, when on account of hills it may be necessary to wait until roads dry in one or two places. Of course you will find quite a few stretches of macadam; most of this, however, is in southern New York and the vicinity of Scranton.

Erie to Warren is 67 m. via Waterford, Union City, Corry, Garland. There are two ways to go from Warren to Olean, but we believe you will find better roads by going to Jamestown, 20 m., via Russell; from Jamestown to Hornell, 110 m., via Randolph, Salamanca, Olean and Wellsville; Hornell to Elmira, 62 m., via Cameron and Corning; Elmira to Binghamton, 61 m., via Waverly and Owego; Binghamton to Scranton, 64 m., via New Milford; Scranton to Delaware



Water Gap, 50 m., via Elmhurst and Mt. Pocono.

Unless you wish to go into New York city, we would advise the following route on almost a direct line to Pittsfield, Mass. It is through a beautiful part of New York state, offering you an excellent opportunity to see something of the Catskills, as well as the Berkshires.

Delaware Water Gap to Port Jervis, 39 m., via Bushkill and Milford; Port Jervis to Kingston, via Brookville, Ellenville, Accord; Kingston to Great Barrington, 51 m., via Rhinebeck and Hillsdale; Hillsdale to Pittsfield, 20 m., via Stockbridge and Lenox. From Pittsfield to the heart of the White Mountain country at Bretton Woods there is a great variety of attractive routes. We suggest the following: Pittsfield to Greenfield, 55 m., via Dalton, Windsor, Lithia and Ashfield. This crosses through one of the most beautiful sections of the Berkshires—good natural gravel road with some macadam.

From Greenfield follow the Connecticut valley nearly all the way on what is known as the main route into the White Mountains, 168 m., to Bretton Woods, going via Bellows Falls, Claremont, White River Junction and Woodsville.

Returning via Lake Champlain, you will find good roads to Burlington via St. Johnsbury, 36 m., and from this latter point to Burlington, 76 m., via Marshfield, Montpelier, Waterbury and Richmond. The route from Burlington to Plattsburg, 64 m., via Keelers Bay, LaGrange and Chazy, has a number of points of historic interest crossing the ferry from Isle of Motte. The route is within view of the lake most of the way, offering many beautiful views and a number of attractive side trips.

Plattsburg to Saratoga, 153 m., is now macadam most of the way, going via Keeseville, Elizabethtown, Underwood, Lake George and Glens Falls; from Saratoga go direct to Amsterdam, 28 m., at which point you will meet the Albany-Buffalo route, with macadam practically all the way. The same is through Fonda, Little Falls and Herkimer to Utica, 64 m.; Utica to Syracuse, 49 m., via New Hartford and Chittenango; Syracuse to Rochester, 97 m., via Auburn, Geneva and Canandaigua; Rochester to Buffalo, 76 m., via Churchville and Batavia; from Buffalo west you will find some macadam, but for the most part it is gravel, or good dirt road, on which good time can be made all the way.

Buffalo to Erie, 89 m., via Fredonia, Westfield; Erie to Cleveland, 101 m., via Conneaut and Ashtabula; from Cleveland you can return via the same route you followed going east, or if you wish a good option, go to Toledo, 121 m., via Elyria, Norwalk and Fremont; Toledo to Ft. Wayne, 108 m., via Napoleon and Defiance; Ft. Wayne to Indianapolis, 131 m., via Huntington, Marion and Anderson, returning to Vincennes via Terre Haute.

You will find complete detailed directions on the above trip in Blue Book, volumes 1, 2 and 4, which in addition to route directions, give a great deal of information as to historic and local points of interest along your whole route.

Rockford, Ill.—Waukesha, Wis.

Rockford, Ill.—Editor Motor Age—I should very much appreciate the best route and roads from Rockford, Ill., to Waukesha, Wis.—Chas. W. Yeager.

There are a great variety of routes offered you between Rockford and Waukesha. If

Speed Trap Warnings

At Camillus, west of Syracuse on the trunk line route to Rochester, N. Y. Since the completion of the pavement the authorities have been much annoyed with speeding. They are enforcing a 20-mile speed limit rigidly and are putting a wire speed trap across the road to apprehend those exceeding this limit.

At Seneca Falls two men are collecting fines. They are stationed at the entrances of the town, east and west, each taking time with a stop watch, the limit being 15 miles an hour. Any persons paying fines are cautioned to get a receipt for their fine so that the matter can be traced to see if the money is turned over to the secretary of state for the good roads fund, as the law provides.—Automobile Club of Utica.

you wish to go via Lake Geneva, would recommend going east to Belvidere and then north to Chemung, Harvard, Woolworth and either around the south or north side of the lake to Lake Geneva, 53 m.; Lake Geneva to Waukesha, 43 m., via East Troy and Mukwonago.

BABIES AS TOURISTS

BABIES are not always a pleasure to their parents, poor things. The idea of a little weak-backed bundle of fat standing in the way of motor enthusiasts badly in need of a long ride to soothe their tired nerves from infant squalls! Take the baby along—but how? A basket in the bottom of the tonneau will give the baby too much jarring unless fitted with shock absorbers, and holding the child is too tiresome. The outcome of this exasperating question is to sacrifice the much needed stimulant and stay at home.

Here is where the inventive mind comes to the rescue, and once again the old adage that necessity is the mother of invention proves out. The illustration shows a novel scheme for making a conveyance to comfortably include the baby in the much needed change. A side elevation and end view is given of this motor car cradle.

The only articles needed are two laths about 30 inches long, Fig. E; two sticks 1 by 1/2 by 18 inches, Fig. M; two coil springs, Fig. B; a pillow or mattress, Fig. D, and 8 feet of rope or heavy twine, Fig. L. The head end, attaching to the left door, C, which will have to remain closed, should be hung so as to keep clear of the back of the seat while the foot of the mattress should butt up against the rear of the seat. The right rope and spring as illustrated is attached to the robe rail. It is needless to say that Fig. H after reposing sufficiently on the heater, Fig. Z, will keep the baby in the best of humor.

Another route a little longer would be to go north along the Rock river through Roscoe and Beloit to Janesville, 31 m.; Janesville to Waukesha, 56 m., via Milton, Whitewater, Palmyra and Eagle. The relative road conditions between the two routes are about the same most of the way, being either good gravel or natural gravelly soil, for the most part not seriously affected by wet weather except after very bad storms.

Racine, Wis.—Antigo, Wis.

Racine, Wis.—Editor Motor Age—Kindly give me the best route to Antigo, Wis.—H. R. Starke.

From Racine you go to Milwaukee and from there direct to Fond du Lac, 62 m., via Menomonie Falls and Theresa. This is all gravel road and although some parts are a little worn, it is not seriously affected by rain. Fond du Lac to Oshkosh, 19 m., on what is locally known as the shore route; Oshkosh to Shawano, 66 m., via Medina, Hortonville, New London, Welcome and Clintonville; Shawano to Antigo, 56 m., via Thornton, Tilleda and Bowler to Birnamwood, where you go almost straight north into Antigo.

You will find good gravel from Oshkosh to Medina; the rest of the way fair-to-good sand road with few rough stretches.

A Blue Book 4 will keep you on the best road all the time.

Rockford-Zanesville, O.

Rockford, Ill.—Editor Motor Age—Will you please publish the best route from Rockford to Zanesville, O. Also, if it is possible to have good roads by going south of Chicago, and thus avoid the city. If so, give route.—J. M. M.

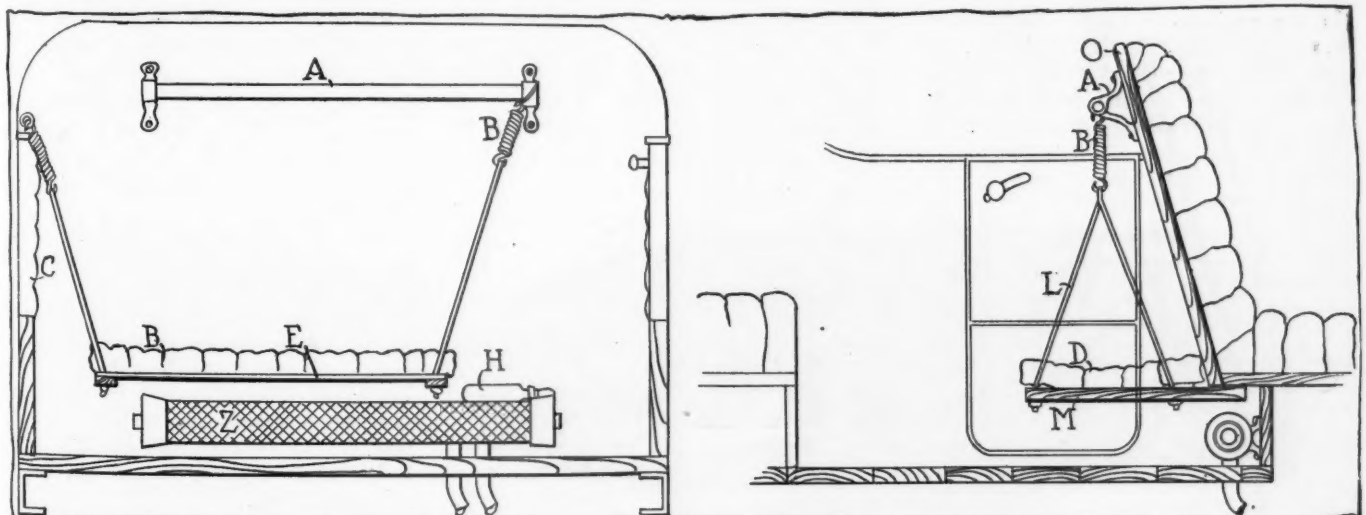
It is possible for you to go to Zanesville and avoid Chicago entirely, although it is a question if you would save any time. One way is to go from Rockford to Elgin and from there to Valparaiso, which is almost straight east 54 m. If you came through Chicago you would go to Valparaiso 52 m. via South Chicago, Whiting, East Chicago and Hobart; Valparaiso to South Bend, 43 m., via LaPorte and New Carlisle. As far as LaPorte you will have very good roads.

From LaPorte to South Bend are soft gravel roads, liable to be rutty due to heavy travel. South Bend to Ft. Wayne, 78 m., good gravel all the way with the exception of a little sand just east of Mishawaka—not bad at any time. This route goes via Goshen and Ligonier; Ft. Wayne to Lima, 63 m., excellent gravel and macadam via Van Wert and Delphos; Lima to Columbus, 89 m., good gravel, via Westminster, Huntersville, Bellefontaine and Marysville; Columbus to Zanesville, 60 m., via Granville, Newark and Hanover.

Almost an entirely different route is to go south 86 m. to Ottawa via Rochelle and Mendota; Ottawa to Bloomington, 77 m., via Streator and El Paso; Bloomington to Champaign, 51 m., via Leroy, Farmer City; Champaign to Indianapolis, 128 m., via Danville, Covington and Crawfordville; Indianapolis to Columbus, 176 m., via National road through Richmond, Dayton and Springfield.

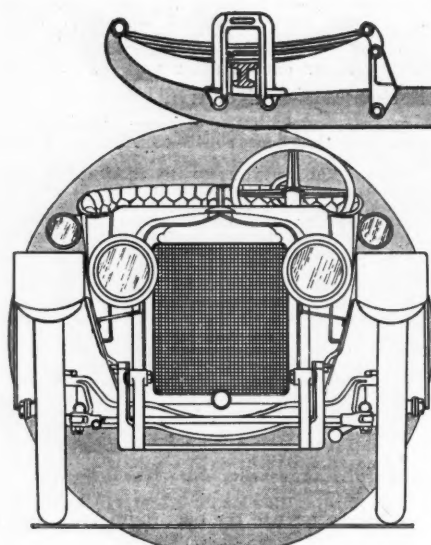
The chief objection to this latter route is the dirt roads, practically all the way to Danville, Ill. If you encountered any heavy rains you would find rather unpleasant going.

A Blue Book 4 will not only give the above road directions, but any side trips of importance you may wish to take through this section of the country.



MOTOR CRADLE FOR INFANTS WHO ARE TAKEN ON TOURS

The Under-Over Car Feature of Mason Line for 1914



FRONT VIEW OF UNDER-OVER MASON
SHOWING SAFETY SPRING CLIP

MASON motor cars appear in new guise for 1914. The cars are replete with new features of design, but the most striking unconventionalities are first, the employment of the Duesenberg motor, which has made such a name for itself when carrying the Mason colors in contests, and, second, what the maker calls the under-overslung frame construction.

The Mason line as a whole for the coming season embraces three models, the model K, which is the conventional overslung type and is similar to last year's line except that a 4 by 5-inch Duesenberg motor is employed, a small under-overslung model with a 4 by 5-inch motor, and a special racing type which also is under-overslung and uses a 4½ by 5-inch motor. All the motors are four-cylinder Duesenberg design.

Model K Continued

Model K is a continuation of the present season's product with the change in the motor design and added equipment in the way of an electric lighting and cranking system. It is listed as a five-passenger touring car at \$1,450. The small under-overslung model appears as a roadster and a five-passenger touring car. The former is listed at \$3,000. The body is

UNDER-OVER FRAME CONSTRUCTION AND
SAFETY SPRING CLIP

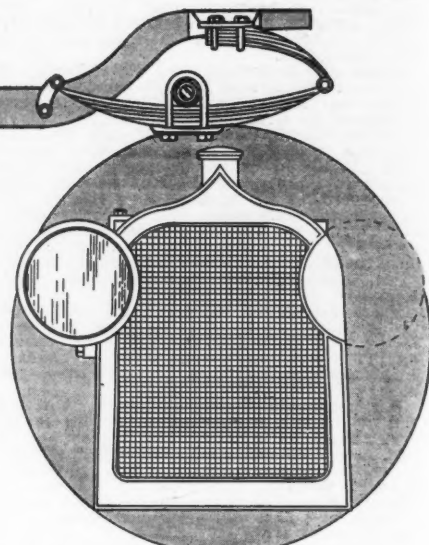
New Hawkeye Design Replete with Novelties—Combination of Underslung and Overslung Suspension and the Duesenberg Motor Are Among Talking Points

designed so that a coupe top may be added at will. Other body types are supplied at special prices. The racy type car is a special speedy creation and is built to order only at a price of \$8,000.

Under-overslung suspension, as developed by the Mason company, is, as the name implies, a combination of the standard construction and the underslung type. It is believed by its designer, C. M. Mohler, to have all the advantages that are provided by underslinging, without inaccessibility of the rear end or the vacuum area at the back that draws road dust into the tonneau. In reality the new suspension consists of hanging the frame under the front axle and over the rear axle. The method in which this is accomplished is shown in the view of the frame.

The Safety Spring Clip

This also shows the mounting of the safety clip at the front axle, which clip also is one of the features of the new car. A front view of this safety clip is offered in the front view of the car, and it will be seen that it simply is a reversed stirrup bolted to the frame and passing over the axle, which is free to work up and down in the clip. This adds a factor of safety in that there is no way for the front axle to become seriously displaced should a front spring break. The safety clip not only provides an auxiliary support for the frame, but also provides against the axle being swept aft and causing loss of control of the car. In fact, it is stated that the operation of the car is not impaired even with a broken



HOW HEADLIGHTS ARE SET IN RADIATOR
IN NEW MASON

front spring, which might be expected to incapacitate it.

Another of the novelties embodied in the new Masons is the radiator construction in which the headlights are incorporated. The two lamps are carried in niches or receptacles formed in the radiator by castings. This gives an almost vibrationless support to the lamps and a neat appearance to the front end of the car.

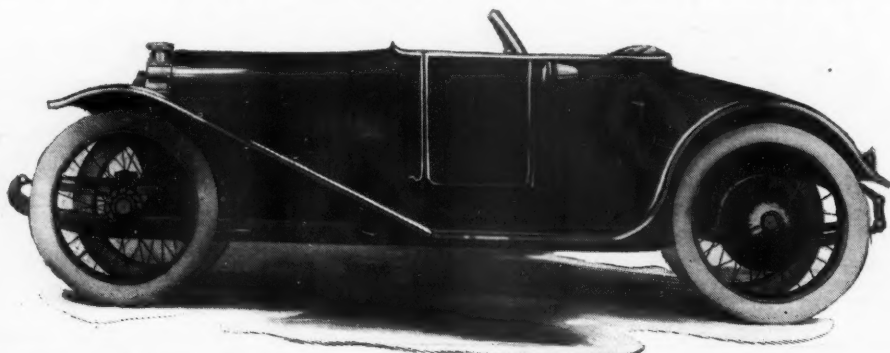
In the steering mechanism is another feature in that the gear is claimed to be completely locked against road shocks. The gear is of the screw-and-nut type, and the special construction is in the speeding of the screw. This revolves three times to each revolution of the hand-wheel shaft, which permits a very small angle of helix of the screw. Consequently, roughnesses of the road which would have a tendency to turn the wheels have little effect.

Turtle-Back Roadster

The tendency of the rear of car bodies to carry dust with them on account of the vacuum formed behind them is lessened in another way in the two-passenger bodies. This is by the turtle-back deck which also gives the body a stream-line effect as shown in the side view of the roadster.

Last of the special features of the new car is the motor. This motor was described thoroughly in Motor Age, October 24, 1912, but is worthy of a brief resume here. Mason cars have the Duesenberg design of motor which did so well at Elgin and Milwaukee last year. In this the valves extend horizontally into the side of the cylinder, the push rods and rocker arms working in and out instead of up and down.

The valves and rocker arms in the Duesenberg motors are all on the left side



1914 MASON ROADSTER WITH UNDER-OVER SUSPENSION AND DUESENBERG ENGINE

of the motor and are covered by an aluminum housing, which makes the valve side of the block casting a smooth surface. The valves are operated by vertical rocker arms or walking beams whose lower ends bear on the side of the cams. The valves open directly into the explosion chamber so that there are no valve pockets. The intake manifold is integral with the cylinder casting. The lower end of the inlet passages are cast as a part of the crankcase and the upper end as a part of the block casting. The cast-iron pistons have three rings in one groove. One of the rings is twice as wide as the other and is placed below the other two.

Lubrication of the valve operating mechanism consists in pumping oil through the hollow rocker arm shaft to the cams and bearings. The cooling system presents an oddity in that both pump and thermo-syphon circulation is used, two water pipes being taken from the lower part of the radiator, one going direct to the motor by thermal action and the other passing through a light pump. The two systems join in a Y connection at the motor.

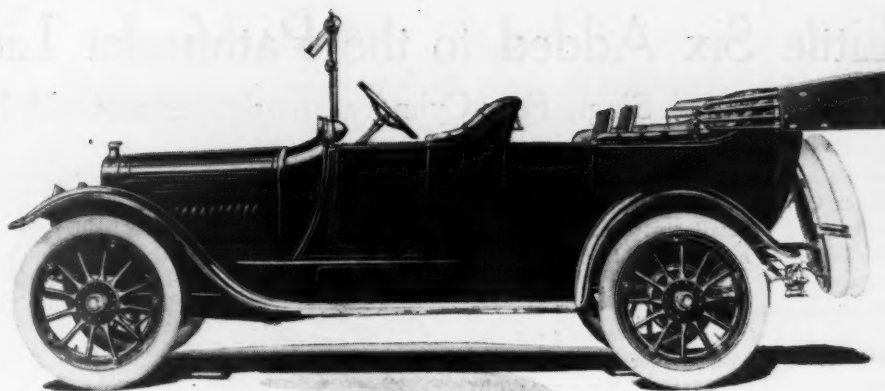
The General Design

Now that the chief features of the cars have been elucidated, we may proceed to the general design. The small under-overslung model has a unit power plant, the motor being 4 by 5 inches in cylinder dimensions. The clutch is of the cone type faced with thermoid and the gearset is a three-speed selective type. The drive-shaft is inclosed in a torsion tube to the floating rear axle. The springs are 36-inch semi-elliptics in front and 48-inch three-quarter elliptics in the rear. The use of chrome-nickel steel for the frame permits this to be very light, although the wheel-base is 128 inches.

Wood wheels are stock, but wire wheels may be obtained as an extra. Tires are 36 by 4½ inches, giving a road clearance of 12¼ inches, even with the under-slung front end. The steering wheel is on the left side with the single control lever in the center. The chief items in the equipment are an electric lighting and cranking system and the special Mason construction of top.

On account of the torpedo lines of the roadster and coupe bodies and the turtle back at the rear, battery boxes, tool boxes, tires and luggage are carried on the chassis or under the body, so that there are no appendages on the outside.

Because of the showing the Duesenberg motor has made in speed contests, a special speed creation is built to order only. This is of the roadster type, but with the larger motor and extreme refinements in materials and workmanship. The cylinders, crankcase, gearbox, etc., are made of magnalium and the pistons of steel. Connecting rods, crankshaft, axles and all other steel parts are of chrome-nickel and chrome-vanadium alloys. Throughout, this car will be designed for speed above all.



BODY VIEW OF NEW LOZIER FOUR-CYLINDER

Lozier Adds a Four; Drops Big Six

THE Lozier Motor Car Co. has returned to the four-cylinder field to a limited extent, the new product making its way into the popular-priced class, being marketed at \$2,100. The Lozier company announced at the same time, that the big six model will be discontinued and the company's efforts confined to two chassis, the new four and the light six.

A number of interesting features are to be noted on the new Lozier product, one of the most striking being the stream-line body which is of similar design to that used on the light six. This body is arranged to carry seven passengers, the extra seats being so arranged that they may be folded into the back of the front seat.

Electric starting and lighting is used, the current supply being obtained from a Gray & Davis generator, which is operated by silent chain from the clutch shaft.

A long-stroke motor of 4¼-inch bore and 6½-inch stroke is used. The displacement is 368.8 cubic inches, which is rather large for a four-cylinder motor. The S. A. E. horsepower for a motor of this size is 28.9. Silence is claimed for the motor, this being accomplished by the silent-chain drive of the front-end gears. The cylinders are of the L-head type and the lubrication the same as in previous models by splash and pressure.

The introduction of the four-cylinder model marks also the approval of the Lozier company of dual ignition, the light and big six of 1913 having been equipped with single and dual double, respectively. A Bosch magneto supplies the ignition current.

Left drive and center control are featured on the new four, this practice having been used on Lozier cars in 1911. The 1914 four-cylinder car is of 120-inch wheelbase and is equipped with 36x4½-inch tires all around, accommodation for spares being at the rear of the chassis.

This car leaves the factory equipped fully, a built-in windshield, speedometer, demountable rims, tire carriers and the Gray & Davis starting and lighting system being the more important.

The first annual convention of Lozier district managers and salesmen brought to a close at Detroit last week was made notable by the introduction of this new model. The sales convention was in direct charge of Sales Manager Paul Smith, who arranged the 3 days' meeting in such a way as to obtain the fullest possible benefits from that space of time. Chief Engineer John G. Perrin gave a description of the new four to the assembled salesmen on Wednesday. This was followed by a talk from President J. M. Gilbert. The salesmen were entertained on Tuesday by a trip to the St. Clair flats. Twenty-five members of the sales and executive forces were taken to one of the private yacht clubs at the flats for dinner, the return being made by moonlight.

The visiting salesmen in attendance were: F. B. Willis, eastern district manager; J. B. Hulett, central district manager; H. C. Whitney, southern district manager; W. J. Drumpelmann, eastern district manager; W. D. Allen, southern district; H. A. Shomo, southern district; J. C. Wheeler, southern district; G. F. Batchelder and H. A. Wehmeir, central district; F. W. Thomas, eastern district; F. H. Smith, general traveling representative.

OHIO AFTER GOOD ROADS

Findlay, O., July 7—A road-making campaign greater than Ohio or any other state in the union has seen in many years, has just been begun in the Buckeye state. Local clubs, auxiliary to the state organization, already have been formed in many Ohio cities, and the work of organization is going rapidly on. The organization is under the directorship of Z. D. Dunlap, with ten assistants. Following the organization of clubs public meetings are being held in the same places, enlisting the masses in the necessity of better roads.

The last general assembly set aside annually for road purposes ½ mill levy to be used on the main market roads. The work is to be done under the supervision of the state highway department. This ½-mill levy in 10 years will amount to \$40,000,000.

Little Six Added to the Pathfinder Line for 1914 Season

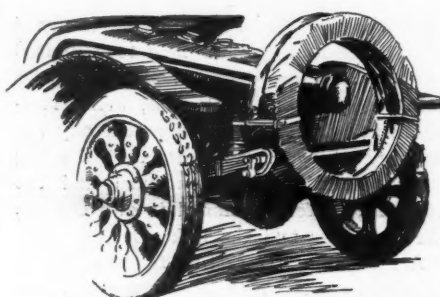
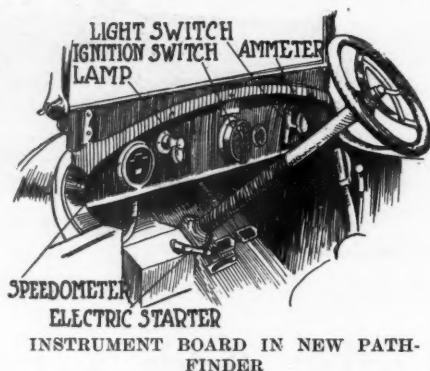
Single Four-Cylinder Chassis Remains with Minor Changes

SIX cylinders is to be the feature of the Pathfinder line for the new season, the Motor Car Mfg. Co. joining the sextuple ranks with a small six to sell at \$2,700. The motor is a Continental 3¾ inches in bore and 5¼ inches stroke. At present arrangements are made only for its production as a six-passenger touring car, but it is probable that other bodies will be fitted later in the season. Tires are 35 by 5 inches in size. It is expected to make deliveries on the new six in August. One of the features of the new Pathfinders is a V-type radiator. The single four-cylinder chassis model which was the sole design for 1913 is continued without radical change. The same size of motor is used as last year. This is 4½ by 5¼ inches in cylinder dimensions and the only change in the motor is the lightening of pistons and connecting rods of the new Continental, which, it is said, results in an increase of about 20 per cent in the power capacity of the engine. In other mechanical features the chassis is a replica of the present season's product.

In brief the motor is an L-head block casting. The chief feature of the motor design is the double lubricating system, which maintains uniform oiling on grades. This is accomplished by having two plunger oil pumps located in the lower half of the aluminum crankcase. One of them sends a stream of oil directly over the gears, from which the oil passes over the main front bearings and drains back into the front oil well. The rear pump feeds the oil back over the main rear bearings from which it drains to the rear oil well. The oil troughs are intercommunicating. Both pumps work on eccentrics instead of cams, making them noiseless.

General Design of Chassis

In the general arrangement of the four-cylinder chassis, there is embodied the unit power plant with the cone clutch in the engine flywheel. The clutch has spring inserts to prevent grabbing and ball release bearings instead of roller bearings to reduce the noise. The gearset is of the three-speed selective type of Brown-Lipe manufacture. The gears are vanadium chrome steel on Rhineland bearings. The gearshifting system is of the sliding tube type. The propeller shaft is enclosed in a



REAR VIEW OF CRUISER SHOWING SPARE TIRES AROUND TAIL

torsion tube which is fastened at its front end to a yoke on the center cross member to take up torsional strains. Side strain in the propeller shaft housing and yoke is removed by the use of a 7-inch slip collar with a bronze bushing.

Easy Maintenance Sought

A floating type of rear axle is employed and the maker lays stress upon the useful feature of the small hole in the axle through which the mesh of the pinion and gears may be felt so that need of adjustment may be ascertained. Any wear may be taken up by moving either bevel pinion of the main differential gear without taking down the rear construction. The entire differential can be removed by taking off a large plate at the rear. Brakes on the Pathfinder are internal expanding and the adjustment for the brakes is directly under the front floor boards, where it is accessible. The conventional right steer and right control are retained. One of the earmarks of Pathfinder cars is the design of the wheel, which by the shape of the felloe is given a colonial effect that is

distinctive. The maker calls it the chariot wheel.

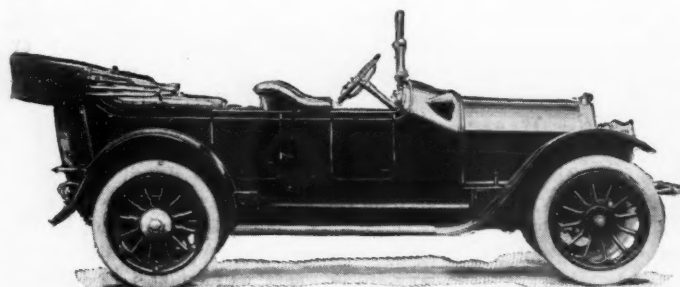
The frame members are particularly deep and are of the double drop type with a very heavy cross member in the center which carries the shifting lever and torsion tube yoke. The body is set on the lower part of the frame so that the axles have a center of gravity even lower than it appears to be. The springs are semi-elliptic in both front and rear, and the spring eyes are bushed with bronze bearings which are renewable.

Both styles fitted to the four-passenger chassis include the Martha Washington coach, a three- or four-passenger coupe, the cruiser, which is a particularly racy type of body with a very long rear deck, and an armored roadster which is being featured as a physician's turnout. The foregoing bodies are the same as last year's styles with minor refinements. A new one is a five-passenger stream-line touring body which takes the place of the four-passenger touring of the 1913 line.

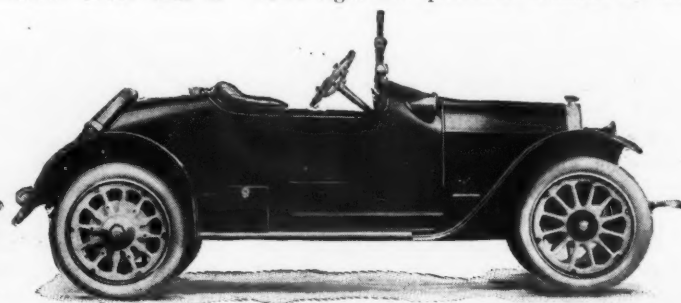
Body Changes

The chief changes in body detail are alteration in lines to produce the stream-line effect and the more sweeping curves in the forward fender, which also has been made perfectly smooth on top, without the conventional side ridge. A new feature of the Pathfinder cruiser is the optional location of the taillight. The taillight may be carried in the conventional way or if desired may be carried in the pointed end of the rear of the car as illustrated in one of the sketches. Where the conventional location is employed, the lamp in the tail proper is replaced by a wooden block. The feature of the armored roadster is the luggage-carrying space behind the seat. The rear deck slants at an angle of about 45 degrees with the vertical and upon it is hung a spare tire. The slanting rear deck is hinged at the top and can be raised from the bottom, giving access to a luggage space which will accommodate several suitcases and is designed especially for a physician's luggage.

New features in the matter of equipment is fabrakoid top instead of the mohair top employed in the 1913 cars. A patent strapping device which holds the bows rigid and prevents wrinkles in the



NEW FIVE-PASSENGER TOURING PATHFINDER

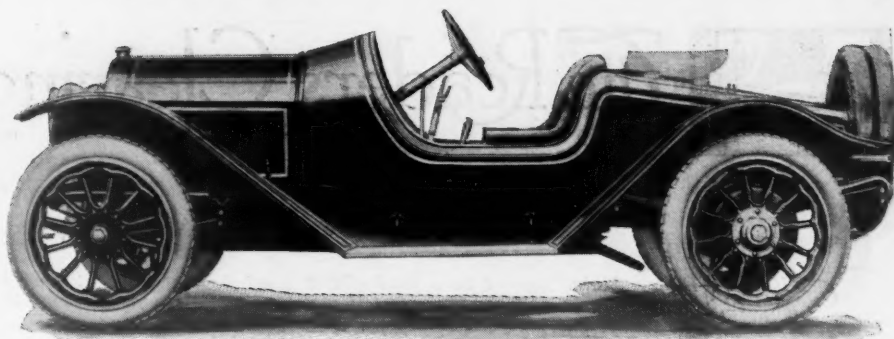


PATHFINDER ARMORED ROADSTER

leather is another of the talking points. A new feature in the upholstery is a double spring construction used in the cushions. The springs are divided in the center and the top section has a slight tension, designed to give easy riding on smooth roads. The lower springs are heavier and come into action on rough roads to absorb the greater shocks.

Lighting and Cranking System

Lighting and engine cranking is provided for by a special Gray & Davis system comprising an engine-driven generator, storage battery and starting motor. The latter is located at the rear of the engine just above the flywheel, which has a toothed band on it, the teeth being engaged by the sliding gear on the motor shaft when the engine is to be cranked. This location of the cranking motor gives a very short and direct control, which consists simply



FOUR-CYLINDER PATHFINDER CRUISER

of a horizontal rod extending from the motor through the toeboard and ending in a foot button.

Lamp equipment includes headlights, octopus-eye sidelights, taillight and a combination dash and trouble light. The lat-

ter is a new feature of the equipment and is made to serve the double purpose by an extension cord which disappears in the cowl when not extended as a trouble light. An electric horn also is an added part of the equipment this year.

New Norwalk Six to Have Vulcan Electric Gearshift

ANOTHER of the car makers has adopted the automatic gearshift for its new cars. This is the Norwalk Motor Car Co., Martinsburg, W. Va., which announces the use of the Vulcan electric gearshift. In general the application of the electric gear-shifting arrangement is similar to that of the S. G. V. cars which was described in detail in these pages some weeks ago. However, as applied to the Norwalk six there are several changes from the installation described, the most notable of which is the arrangement of the control features mounted upon the steering wheel of the car.

The advent of the electric gearshift has given rise to a discussion relative to the amount of current drawn from the battery, but it has been found under ordinary conditions, a maximum of 30 amperes has been consumed and this only for approximately one-third of a second, which is only the time consumed in pulling the gear into mesh, after which the current is broken and the gear is held by the usual interlock. The tests of the consumption and operation were made on the device when attached to an experimental car. After having been driven 3,000 miles, readings being taken with three different ammeters, all separately calibrated. The pull of the coil approximates 35 pounds at 1½-inch air gap. This increases as the plunger passes further into the magnet shell.

The use of electric gear shifting device, with its speed selecting switch on the steering gear, has entirely done away with the inconvenient levers at either side or in the center of the car and allows ingress or egress to and from either side door to the front seats. The clutch and brake pedals of course are used, the latter being made with a divided pad allowing for separate operation of either emergency or service brakes or simultaneous action of all brakes if desired. The emergency brake pedal is fitted with a magnetic

latching device which can be brought into action by merely depressing a suitably marked button on the steering gear.

EUROPEAN BODY DESIGN

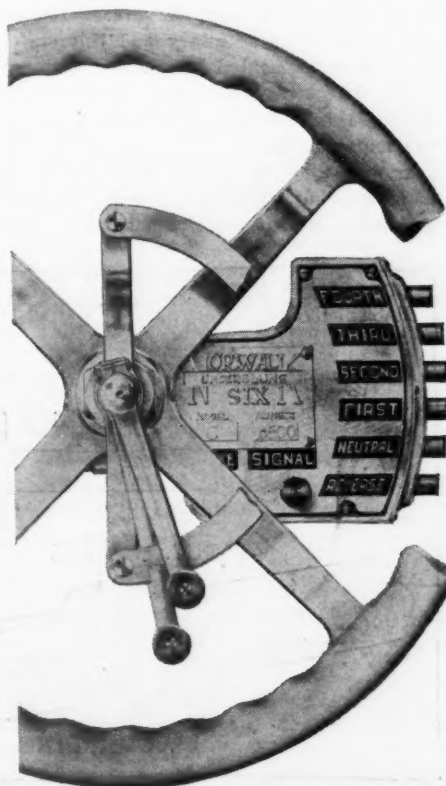
According to reports from Europe, bonnets must harmonize with the car bodies. This is so thoroughly understood that there will be probably no car at the Paris show with an abrupt break at the dashboard. Where they do not make complete cars, manufacturers are willing to sacrifice their bonnets to make their covering harmonize with the bodylines. Gas tanks either will be on the front of the dashboard or under the scuttle dash.

Next year's car lines will not only be of the straight-through type, but all angles will be rounded off.

Instead of the radiator frame having sharp angles, these will be gently rounded off, thus removing a certain harshness which exists with the usual sharp break. The rounded off radiator also harmonizes better with D-fronted closed cars and the rounded-off stern. There will be considerably more examples of side lamps let in flush with the scuttle dash, thus avoiding the use of lamp brackets and projecting lamps. Headlights are a more difficult problem, the only change that has been found in this direction being the fitting of a single lamp in the body of the radiator, as found on a certain American car.

DISCUSS SELF-STARTERS

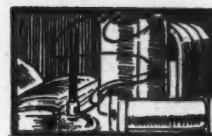
New York, July 5—At a meeting of the metropolitan section of the Society of Automobile engineers held at the headquarters recently, the starter papers presented at the last meeting were discussed. During a large portion of the evening the discussion centered on the point of whether or not there was a great difference in speed as the engine was turned over the point of maximum compression or, in other words, past upper dead center. E. V. Hartford, of the Hartford Starter Co., maintained that with the ordinary type of starting motor, the speed dropped from eighty revolutions to fifteen revolutions per minute, the momentary speed on passing the point of maximum compression. Leonard Kebler, of the Ward-Leonard Co., stated that in his belief the speed did not vary more than five or ten revolutions per minute. Other points that were discussed were the advantages and disadvantages of the 6-volt system; the single unit vs. the double unit for motor and generator; permanent gear connection vs. temporary mesh, the necessity of providing against back kicks and the proper gear reduction between cranking motor and engine.



ELECTRIC GEARSHIFT CONTROL ON NEW NORWALK SIX STEERING WHEEL



The Readers' Clearing House



Tire Valves a Weak Spot

CHICAGO—Editor, Motor Age—I have read with a great deal of interest the editorial in a recent issue of Motor Age entitled, "Why Motor Car Tires Wear Out," and the suggestion seems particularly appropriate that since the car owner has nothing to do except pay his good money for a car and stand all the trouble and annoyance of having tire failures, it is only fair and reasonable that he should take the blame also.

It long has been known that a tire, to do its work properly, must be properly inflated; but I, for one, often have been curious to know why the manufacturers cannot supply us with tire valves that will not leak and allow the air to escape. The example given of a tire losing 52 pounds pressure in 4 or 5 days is not unusual; and probably in the majority of such cases the leakage is through the valve. It seems to me then, that at least the suggestion might be made that the valves might be better designed or more carefully made so as not to allow of such leakage.

In my 12 years' experience with motor car tires I never have seen a valve which could be always depended upon to hold air without leaking.

The other suggestion about filling up cuts is also good in theory, but not so good in practice. When the plastic cements for filling tire cuts were first introduced in the market I bought a can and started to work to fill the cuts in my tires; but the first glance showed me that I might as well try to fill all the holes in a screen door. It may be that it is impossible to make a tire which will not be cut by every little sharp object with which it comes into contact, but I believe that if anyone took the time required to keep the cuts filled as often as they are made, there would be very little time left for using the tires on the road.

The foregoing is a suggestion of what has been my experience. If any reader has been more fortunate in securing service out of his tires, or has been able to utilize the suggestions in Motor Age's editorial, I would like to see his views expressed.—S. D. Hirschl.

ENGINEERS ON REAR AXLE GEARSET

Summary of Engineers' Discussion on the Subject Is Outlined

MILTON, No. Dak.—Editor Motor Age—1—Explain the operation and construction of the electrical gearshift as used on the S. G. V. cars.

2—How is the voltage of the battery that is used in connection with a low-tension magneto with a non-vibrating coil raised to a sufficient voltage to jump the gap of the spark plug?

3—What is the advantage of mounting the transmission of a car on the rear axle? Its disadvantages?

4—What are the relative advantages and disadvantages of the floating axle?—A Reader.

1—This was described and illustrated in Motor Age issue of April 10, page 30.

2—In some installations the current from the battery passes through a separate coil which in the case of the Packard is in the same box with the magneto coil. In other systems the battery current passes through the same coil as the magneto current. The battery current is interrupted by the magneto contact-breaker. For starting on the spark, a special vibrator is fitted sometimes.

3—A discussion of the merits and demerits of the rear axle gearset was taken up by the engineers of the various motor car companies, in the Automobile, and the following is a summary of what has been said on the subject:

Those in favor of the rear axle construction state that this type is more quiet than the others and especially in inclosed cars is the gearset hum negligible, for the gearset being far back the noise does not penetrate the compartment. It is stated also that the rear axle gearset unit, being heavier than the usual rear axle form, better traction is gained by the tires, which means less skidding. Further discussion brings forward that the rear axle gearset requires a number of long control rods, which the unit with motor and amidships construction does

Questions Answered and Communications

S. D. Hirschl.....Chicago
A Reader.....Milton, N. D.

The Cyclecar Section

H. M. Post.....Owosso, Mich.

not call for. A longer drive shaft is possible when the gearset is a unit with the rear axle, which means that there is less strain on the universals, is the opinion of a number of engineers. According to another engineer only one grease retaining reservoir is necessary and this statement is supplemented by another engineer to the effect that the grease contained in the case is not thinned by the heat of the motor or the muffler pipe. With the rear axle type the clutch is accessible, it is stated, but exception is taken to this statement in that the clutch being housed

makes it no more accessible than any other form. One engineer upholding the rear axle type claims that in a certain make the gears of the gearset may be removed in a very short time and that the removal of the tonneau floor boards is no more difficult than the removal of the front floor boards. An advocate of unit with motor construction states that in his construction the entire gearset may be inspected and oiled without difficulty whereas with the rear axle construction inspection is not easy and lubrication difficult. That the rear axle with gearset weighs more than other types, is brought forward, but is argued against by one maker who adds that his rear axle weighs but 20 pounds more in the rear than does the ordinary form of rear axle and that this slight increase in weight is not worthy of consideration.

With the rear axle gearset the axle shaft must be heavy, which increases the weight

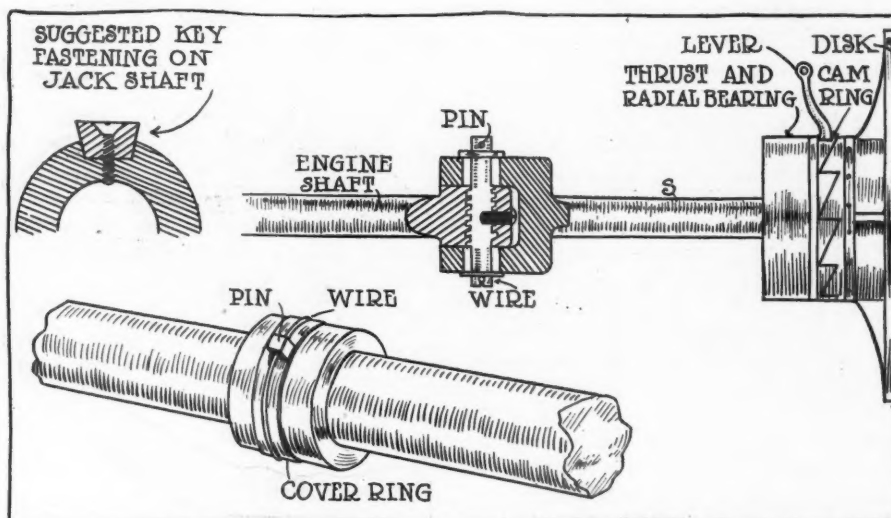


FIG. 1—DETAILS OF TRANSMISSION FOR CYCLECAR

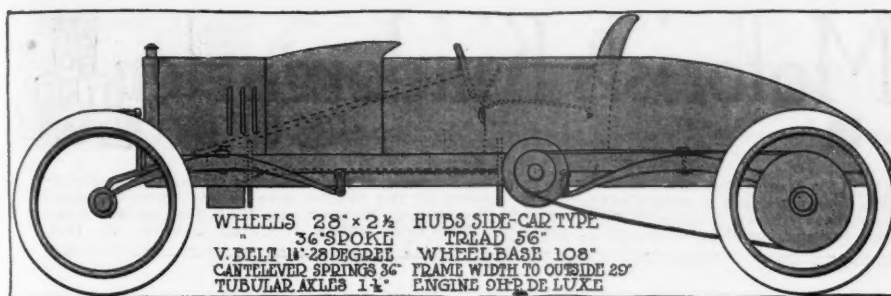


FIG. 2—PROPOSED DESIGN FOR NEW CYCLECAR

on the tires, and it is stated this extra weight means greater tire wear. The statement is made that the rear axle type simplifies the chassis, but an opponent brings out that the control linkage is not simple and that the oscillation of the car springs is communicated to the sliding gears which results in indefinite gear location.

Further discussion shows that in the rear axle type there is more unsprung weight on the rear tires than in other types of construction, which means excessive tire wear, but an adherent of this

type states that in actual test the tires have been found to stand up better than if the gearset were located with the motor or amidships.

From the discussion of the engineers it appears that in order to determine the advantages or disadvantages of a certain type of construction a definite example should be taken, for it is not so much the design of the gearset and its location as it is the synthetic design of the car as a whole.

4—This was given in Motor Age issue of June 26, page 26.

8—For the length of frame you mention, but with no other definite data, answer would be more or less guesswork. Try 1 1/4-inch and 4-inch depth. Less will do if the body is part of the frame—as it should be in a cyclecar.

9—This depends entirely on the rest of the construction, but sheet steel fittings bolted in place would fit most cases. Use about No. 16 gauge steel or heavier and make into angles to fit all four sides.

10—This may be had from the shaft diameters given. Bearings for smaller diameters can be used—except behind the friction disk—if the design allows of reducing the shaft diameter at the bearing points. Behind the friction disk have a large bearing to take the thrust.

11—The firm from which you get the bearings will send you complete drawings and directions for mounting them.

13—Have a loose joint where the engine shaft joins the friction shaft, as shown, Fig. 1, with cam ring on shaft to produce thrust. These arrangements can be had from the Rockwood people, who make the frictions.

14—From 60 to about 400 pounds.

15—Use a pedal and ratchet preferably, as spring pressure sufficient for low-gear work is too strong for high and wears out the disks.

16—Run a line from the steering pivot to the center of the rear axle and this line will be the one the steering arms follow whether in front or back.

17—Rockwood Mfg. Co., Indianapolis, Ind.

18—No, not if you use standard constructions.

19—The question is not clear. The follower always has a beveled edge. An advantage might be obtained on high gear by bevelling at the angle of a similar bevel gear, but this would introduce new end thrusts. Avoid extra mechanisms.

20—Yes, but the spokes would suffer. No others are available at present, but Harris & Reed, 1515 Fifteenth St., Chicago, is about to put a 4-inch hub on the market for this purpose.

21—The brake you mention is sufficient, and the friction drive itself can be used for emergency brake. Maple-wood soaked in linseed oil is a material used abroad with success. Raybestos over wood would do the work. As a suggestion, do not try to use belts smaller than 1 1/4 inches nor pulleys of less diameter than 6 or 7 inches.

Why not try 36-inch tread? This will get your weight down and wind resistance as well, you can seat tandem, and build for much less money. A cyclecar cannot be a car. To try to make a car of it involves too much expense and what is hindering the movement in England more than anything else is the fact that most of the makers have gone to the small-car class. In spite of this out of twenty-five first-class awards in cyclecar trials in England, but six have been won by the small-car type.

The Cyclecar Section

Reader Who Is Designing a Cyclecar is Given Measurements and Method of Mounting Motor on Frame

OWASSO, MICH.—Editor Motor Age—I am designing a cyclecar to seat two people side by side. See Fig. 2. Car weight about 400 pounds; 9-horsepower motor.

1—What heft and size tube should be used for axles? Load about equally divided. Wheelbase 108 inches, tread 56 inches.

2—What size and width fibre disc should be used? Not less 12 inches.

3—What size drive disk should be used? Same diameter?

4—What size and heft tubing or shaft should be used for propeller shaft between engine and transmission? Depends on design. About 1 inch.

5—What size and heft tube or shaft for jack shaft? 1 3/16 to 1.

6—What method should be used for keying sliding disk on jack shaft, if tube is used? Screw key.

7—What method should be used for holding De Luxe engine, or similar one, in frame. We intend to use wood frame and cross frame for engine.

8—What heft oak should be used for side members? Wheel base 108 inches cantilever type springs will be used.

9—What is best method of fastening corners of wood frame?

10—What size pressed steel annular bearings should be used on propeller and jackshafts?

11—What is best method of securing inner race of annular bearings to tubular propeller and jackshaft?

12—What method is best for securing outer race in brackets?

13—How should sliding of propeller shaft be obtained where annular bearings are used on propeller shaft? That is how can we allow this bearing to slide so friction disk can have end play?

14—What pressure will be required between disks, so there will be little possibility of slippage on low gear, or when greatest power has to be obtained?

15—Would spring tension be practical to hold disks in contact, or would pedal pressure be most practical to use? Pedal and ratchet.

16—How are the steering arm angles determined for best steering?

17—Where can friction fiber for transmissions be obtained?

18—Is there any patent on friction transmission application that would prevent use without paying royalty?

19—Has friction drive with beveled edge on high speed any material advantage?

20—Would standard knock out axles of side car hubs be strong enough if end was brazed and pinned in axle tube?

21—What type of inexpensive brake can be fitted to rear wheels? Have contemplated using a V-shaped strip in the V of the belt pulley at the front and between the belt. If this type would answer, what material would be best?—H. M. Post.

In the first place, it is hard to see how you are going to build a 108-inch wheelbase car of standard tread within 400 pounds weight or even if built, drive it with a motorcycle-type motor. If you make the standard-tread type, put the seats side-by-side and shorten the wheelbase, but even then you will have to make a number of changes to get the weight to your limit.

1—This depends on the weight you actually carry. Try 1 1/4-inch tubing about No. 12 gauge and reinforce it or truss it if necessary.

2—For the horsepower and revolutions per minute specified use a 12-inch disk and a 12-inch follower. The actual working face should be not over 1 inch wide, but beveled 30 degrees at the edge.

4—Not less than 1 3/8 inches diameter. Gauge depends on distance between bearing and pulley centers—not given.

5—About 7/8-inch.

6—Use keys on shaft, fastened in keyway with countersunk screws, perhaps, and a keyway to fit the key in the hub of the follower wheel.

7—Make a cradle to fit engine crankcase bolts, or fit tubing under the motor in a loop and fasten as it would go on a motorcycle. Then fasten tube to frame. The sheet-steel cradle idea is best.



The Motorist's Kindergarten



EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car. The first article appeared October 10, 1912.

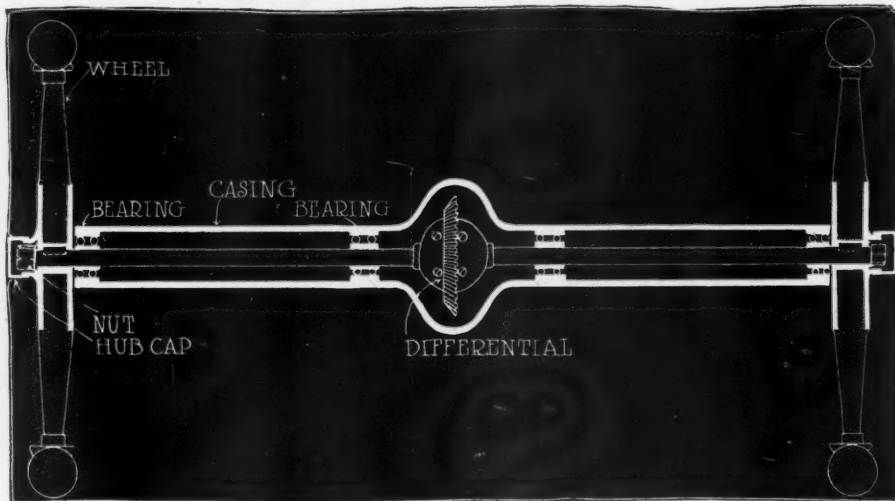


FIG. 75—TYPE OF SEMI-FLOATING REAR AXLE

Note that both axle bearings are inside the axle housing, thus the wheel rests on the axle

In last week's issue the differential and its various parts were discussed and it was stated that the rear axle of most motor cars is in two parts. Only in cars of the double-chain drive is the rear axle one piece, for in such vehicles the differential is placed on the countershaft which is in two parts. If the differential is in the rear then the two-part axle must be in the rear. In other words, the differential and two-part axle always are found together.

The double-chain-driven car has its rear wheels mounted upon a one-piece stationary axle just like horse-drawn wagons. This axle is called a dead axle, because the wheels revolve upon it, the axle remains still. But all shaft-driven and single-chain cars have what are called live axles. They are called so because they, too, move with the wheels.

Ordinary motor car nomenclature gives us three types of live rear axles, called respectively floating, three-quarter floating and semi-floating. For the present the three-quarter floating axle will be disregarded because there seems to be no accurate definition of this type and no two manufacturers produce the same type, of what they call three-quarter floating axle.

The floating axle, as the name implies, is one that floats, that is, it turns around but it does not carry any weight. It is used to gain rotary motion only. The semi-floating axle however, not only turns the wheels but takes some of the weight of the car. The difference between these two types of axles is in the position of the bearings.

Rear Axle Types Explained

It was stated in a previous article that the rear axles of motor cars are contained in a housing or case. This housing is made of metal, in some instances aluminum alloy, in others cast steel or other material.

In Fig. 76 is shown the floating axle, and its position with reference to the rest of the parts of the rear end. The casing, axle shafts, rear wheels, etc., are referred to, very often, as the rear end of the car.

The differential of the floating axle is shown with the axle shafts on both sides of it. At the inner portion of the axle shafts are two bearings one on each side. These bearings, as will

be noticed, are inside of the housing. However, at the outer ends the bearings are outside of the housing. The rear wheels of the car rest upon these bearings. It can be seen plainly that if the wheels rest upon the bearings and the bearings upon the housing that the housing must support the weight of the car. In other words, the car would stand up even if there were no axle shafts in the rear end.

Now we come to the fastening of the axle shafts to the wheels. At the outer end of each shaft is a flange and this flange is bolted to the wheel. In this way the turning of the axle shafts makes the wheels turn. Sometimes this flange fits so that the wheel hub is flat, in which case no rear hub cap is necessary, but instead just a covering is provided.

In the semi-floating type of rear axle illustrated in Fig. 75 the inside bearing occupies the same position as previously, but the bearing for the wheel instead of being outside the housing is inside the housing. In other words, the axle shafts rest upon two bearings, one at each end of the shafts. The wheel then is put on the axle and held there by a key usually. Sometimes the ends of the axle shafts are square and the inside of the wheel square so that no key is necessary. With the wheels on the axle shafts, nuts are screwed on the ends of the shafts to prevent the wheel from backing off. The nuts are locked with cotter pins.

It is clear that if the wheels are resting on the axle shafts and the axle shafts on the bearings in the housing that both of the latter members must hold up the car.

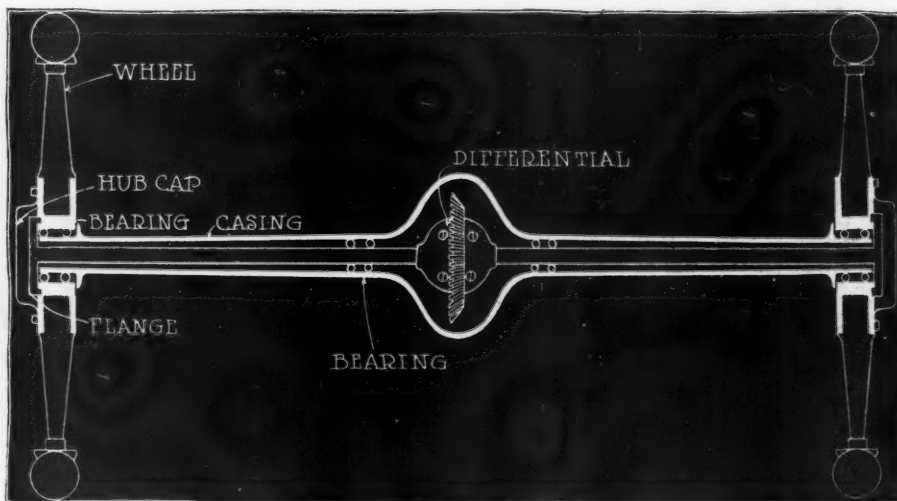


FIG. 76—TYPE OF FLOATING AXLE

Here the bearings at the ends of the axle shafts are outside and resting on the axle housing



The Motor Car Repair Shop

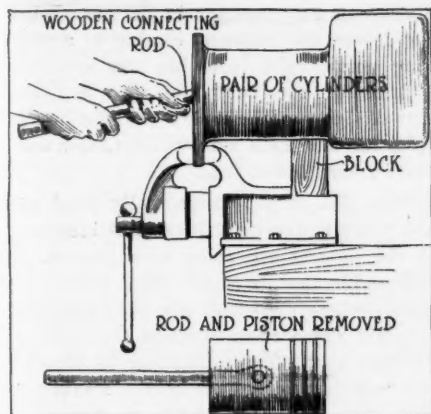
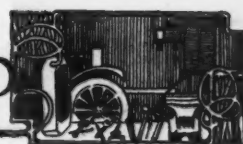


FIG. 1—LAPPING IN PISTONS

IN Fig. 1 is shown a means and a method employed in a large repair shop to lap the pistons and rings of motor car engines. To lap a piston or set of rings means to work them into a good fit, generally by means of friction and some suitable abrasive, as in grinding a valve. One speaks of grinding in a valve, but when treating pistons or rings in a similar manner the operation is termed lapping.

The equipment for lapping in a piston or set of rings as shown in the illustration is very simple, comprising simply a long wooden connecting rod, an old piston pin and an old cylinder. In the shop in which this equipment is in continual use, the strictest economy and the utmost efficiency is demanded from the motors overhauled therein, so when cylinders and pistons and rings become so worn as to need replacement, the cylinders are rebored, new pistons are fitted, and these are then lapped in to assure good compression and durable service.

Special Cylinder Used

It is not customary in this shop to lap the pistons and rings in the cylinders in which they are destined to work; but in an old cylinder used only for the purpose of lapping in pistons and rings. It is customary in some shops to lap the pistons into their respective working cylinders when the pistons happen to be a little too large, but this is a practice that requires so much care and skill on the part of the operator that it is not generally to be recommended.

As the operation of lapping in a set of pistons by hand is quite a laborious one, it also is one that the skilled operator shuns and gives unto the junior repairman to do; hence there is always the danger of overdoing the good work and making the pistons too small, in which case a new set would be required and the repair becomes doubly expensive. For lapping a piston in an old cylinder an abrasive consisting of

The Lapping in of Pistons

a pasty mixture of fine carborundum and cylinder oil is used, while for lapping in a set of slightly oversized pistons in their own working cylinders, powdered pumice stone or rouge, such as is employed in polishing brass and nickel-plated articles, or very fine ground glass has been recommended. Water generally is used with pumice stone instead of oil.

When an old cylinder is used for lapping in pistons and rings, the rings should be removed as soon as they have received a smooth surface, then the piston should be frequently cleaned by rinsing in kerosene or water and tried in its working cylinder. When the piston begins to slide into the cylinder a little persian blue, or black or red lead, such as is used in fitting plain bearings, may be used to see if it is a good fit. The rings also may be tested in the same way. After the operation is complete a thorough cleansing of the piston, rings and cylinders is most essential.

If proper tools are at hand for the removal of piston rings without springing them it might be advisable to remove the rings to facilitate cleaning all particles of the abrasive from the grooves, but even with the best facilities for removing rings they are quite liable to be sprung in removal. It is the best practice, therefore, to leave the rings in their grooves whenever suitable means are obtainable for a thorough cleaning without their removal.

Iron Rail Useful in Shop

In Fig. 2 is shown a piece of an iron rail secured to a workbench of a motor car repairshop. This was seen in a well equipped shop, near the tinsmith's bench, and it serves as a sort of anvil for many kinds of odd jobs, such as straightening fenders, mud pans, dented lamps and tanks, etc. It is set at an angle as indicated, probably because it was too long, perhaps, to give a greater counter-balance for the weight of the overhanging section, or possibly for greater convenience.

In order to reduce vibration and noise when using this makeshift anvil, the channels are filled with wood as shown; the two heavy strips tightly held in place by means of bolts passing through the thin vertical section.

Straightening Fenders and Lamps

The straightening of bent motor car fenders is one of the most common jobs extant; it is such a delicate operation, however, that whenever it is convenient such work generally is sent to the coach-builder, where the proper facilities and specially adapted workmanship are employed for this kind of work. A few words

on the subject, though, may be of assistance to those who are occasionally called upon to do work of this kind without these facilities.

For instance, to straighten a bent fender or mud guard it should be first warmed slightly so that the paint will not be so apt to crack or chip. A large flat-nosed hammer, or preferably a wooden mallet, should then be prepared by padding the nose or hitting surface with several layers of thick felt or cotton flannel. The fender or piece to be straightened should then be rested on a hard, steady, smooth surface like the rail above described, or on an anvil, or some similar object having a surface conforming as nearly as possible to the original form of that of the part to be straightened. The painted surface should then be lightly pounded back into shape. Great care in distributing the blows is essential if a smooth, even surface is to be obtained without damage to the paint. One should not attempt to complete the job too quickly. In the same way one may remove dents from lamps and all such parts of sheet metal having both sides or surfaces accessible.

Keeping Parts Together

In the motor car repairshop considerable time and trouble can be saved by keeping component parts together when disassembling the car or parts thereof. The carelessness in this respect which exists in so many motor car repairshops is really appalling. For example, a carburetor may be removed for inspection. To remove it several nuts are taken off. Often these nuts are laid on the running board or inside the channel of the frame, or perhaps placed on the bench near the carburetor. On inspection it is found that the carburetor needs a new nozzle, or a part of it requires repairs that require a delay of some hours or days before it is replaced. The nuts are forgotten. Often it is necessary to remove the bottom cover from the crankcase or the cylinders from the crankcase. In either case as soon as the parts are taken off the nuts should be screwed back on their studs.

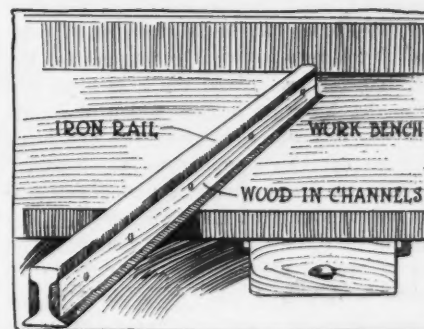


FIG. 2—IRON RAIL USEFUL EQUIPMENT



The Realm of The Commercial Car

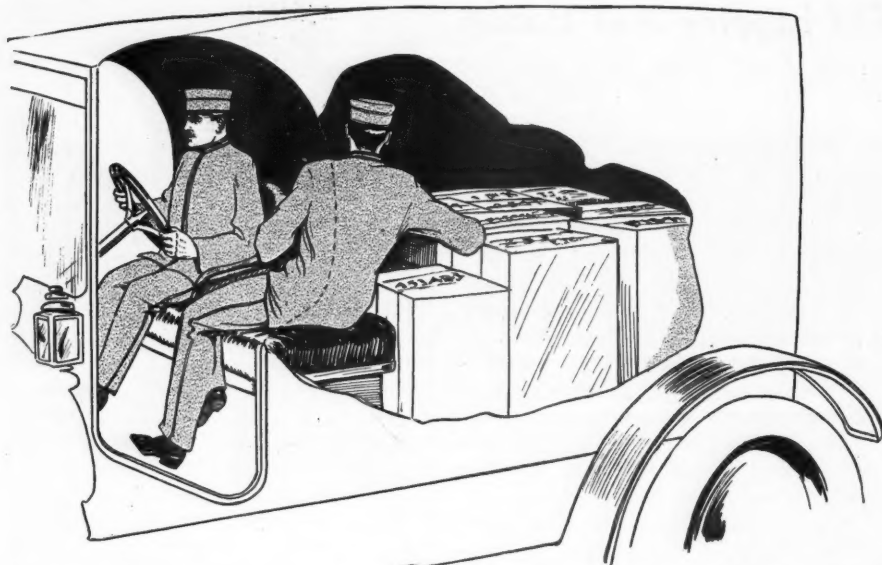


Fig. 1—Bundles of uniform size are set on end, the address being written in large abbreviations on the top of each

Motor Trucks in the Department Store The Rothschild Shipping System

MAURICE ROTHSCHILD & CO., clothiers of Chicago, have greatly increased their facility of service and at the same time have cut down delivery cost by putting into service six motor delivery wagons of 1,000-pound capacity, operated under contract by the Edgerton Motor Delivery Co., at a so-much-per-day rate. Other firms formerly have experimented with the charge-per-package system in Chicago and have had a difficulty in making the showing necessary for a dividend. The Edgerton concern by charging by the day is sure of income irrespective of the volume of business of one season or another. The trucks are hired by the Rothschild firm for the period from 9 a. m. to 7 p. m.

The same delivery company operated the same firm's delivery formerly with horse equipment, using in the service fourteen horses and five wagons. The number of horses for the road equipment was made necessary by the length of the runs for the horses had to be changed at noon and fresh ones put on the wagons for the afternoon runs. Since the afternoon run was the heavier, horses which did this run one day did a morning run the next, and so on, this evening up the work.

With the horse system, covering not over 30 miles even with the two horses, sixty packages a day was a maximum. The motor trucks are running from 50 to 70 miles a day and delivering as high as ninety bundles a day. A great deal more territory is being served direct by the

By William B. Stout

store delivery system than was possible formerly, this having increased trade considerably in the new sections covered.

There are a number of unusual features in this particular system made possible by store conditions. For example: Most of the packages delivered are ready-made suits in boxes of uniform size. These allow of an interesting system of loading on end with the address in plain view which saves considerable time on the road. When the bundles are sent through the shipping room, the address on the sales slip is copied off and marked on the end of the pasteboard box with a black grease-pencil, the name of the street being abbreviated and the letters being big enough so that when the load is set on end in the car, as in the drawing, the driver or helper can read at a glance the

address on any package in the car. When the driver, for instance, coming to a stopping point, calls from his trip card the address of the next stop the boy can turn in his seat and pick out the bundle from the load as a man would take a card from a card index case.

This idea is an exceptionally good one and possibly the most important idea seen in the present operating arrangement. It is possible that in some other stores, for routes where deliveries are near together, it might pay a store to adopt the uniform-package idea, for the saving in time of the vehicle and helpers might amount to more than the cost of the packages.

The routing of a bundle through the store from purchaser to home is interesting. After the purchase of a suit, for example, it goes to the tailor shop on a top floor, and from here, in time for the delivery for which it is ordered, it is sent down to the basement shipping room. At present the delay in getting away on the part of the trucks is largely due to the tailor shop not having things ready when due, so that drivers often wait ½ hour for bundles which have to go out on that delivery but which are not yet ready.

The bundle comes down to the shipping room on a small elevator or dumb waiter and is loaded with others onto a floor truck and pushed to the receiving window of the routing room.

This room, as in Fig. 2 consists of a central cage in the center of the shipping room with an alleyway on three sides. The drivers of the cars and their helpers remain in this alleyway and are not allowed in the sorting cage.

The boy, rolling the floor truck to the entry window, passes the bundles through a window. The shipping clerk receives them and checks them off, tossing them to a central table. A router sorts them from here and throws them onto a further counter on the other side, divided off into bins by chicken-netting partitions. Each bin represents a route. Drivers have no access to these bins while the sorting is going on, for the doors on the far side are held closed with a catch worked from the inside.

When the loads are ready these doors are opened and the drivers, standing at the back, receive them as the shipping room man checks off the bundles on the entry slip. This slip is a mere list of bundles made out in triplicate with the addresses, etc., included. No special blank is used. As the bundles are checked off the driver stacks them on the floor wherever convenient.

When all the bundles are received the driver gets a floor pass for the number of bundles he carries, which must be presented to the floor watchman at the outside door upstairs when the load is carried out; this is to prevent theft.

One copy of the trip or entry sheet is given to the driver, who keeps it in a sheet-metal holder as shown in Fig. 3, the construction explaining itself. The springs at S push the strip L down against the lower base, the contact being on the hinge line H. The paper is slipped under the hinge at this point, as

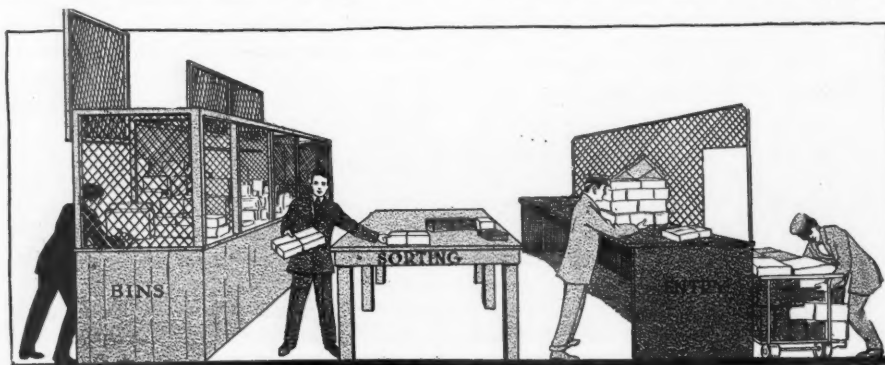


Fig. 2—Routing of bundles through the shipping room

shown. The cover C pivots about this hinge, when raised to see the sheet underneath. The device is simple and waterproof, keeping the paper from wear in the hands of the boy helper who will have charge of it later.

The driver, before leaving the shipping room gets a piece of pasteboard from somewhere and copies off from this list of names in the order of his route, this cardboard being posted up in a conspicuous place in the delivery car later.

At the stroke of a gong the drivers start loading. There is an elevator leading from the basement where the shipping room is located, but this is not used in loading. The drivers pick up as high a stack of bundles as they can safely carry, for the load is bulky rather than heavy, and carry it through the shipping room alley, up a flight of steps to the street level, and then for about 200 feet out through the store, presenting the bundle-pass at the door as they go out.

The delivery boy receives the load at the sidewalk and loads it into the vehicle in the order of the route, with the address end of each box up, and bundles of miscellaneous size at the back.

The plan of the car is seen in Fig. 5, with the load in place. The only door is on the left side of the car, the steering wheel being on the right. There is a back to the driver's seat but not on the helper's side. This enables the helper to get his bundles off quickly and without hindrance. There are doors at the back of the car but these are used infrequently, as the car is short and the load can be reached from the seat, except when the truck first starts out and the box load is stacked in the way in front. Then, if a big bundle has to be gotten at in back, the rear doors are opened.

Here might be mentioned the hindrance in the right-hand-drive feature of the cars for at every stop the helper must run around the car as by the dotted line. This means 24 feet of extra run per bundle or on a ninety-bundle day nearly a $\frac{1}{2}$ -mile of running on the part of the helper. With left drive the boy could get off in a direct line for the delivery. To save time at present, the boy drops off before the machine stops and lets it run ahead so that he saves the run back, but the extra distance is still there, as well as the danger of the drop-off. The same thing is done when coming back, the boy running in front of the car and jumping it as it passes by. This is all a loss and a risk.

Having the plan of the car in mind, and the method of loading, one can better follow a trip. Remember that the truck arrived at the store at 9:30 a. m. and that it stood until 10:29, most of the hour used in loading being due to tailor-shop and shipping-room delays. If the bundles had been ready for the cars at 9:30 the cars could have been away at about 9:50, allowing time for listing of routes.

To get the conditions of delivery an actual trip was made on the machine as follows:

The car left, as stated, at 10:29. After a run of a half mile it was held up at the Rush street bridge, while two steamers went through the draw, this taking 10 minutes. Four minutes was used up in traffic otherwise.

Time.	Del.	Pack-	Miles.	Min.	Kind of Del.
	ages.	ages.	Dist.	Delay.	
10:36	1	1	1	10	
10:47	1	1	1	1	Hotel
10:51	2	1	1.3	20	Fan belt broke
11:12	3	1	1.9	2	Apt. Store
11:15	4	1	1.5	3	Apartment
11:18	5	1	1.9	1	Apartment
11:20	6	1	2.0	4	C. O. D.
11:24	7	1	2.2	1	Apartment
11:27	8-9	2	2.8	4	Hotel
11:35	10	1	3.9	4	Apartment
11:42	11	1	4.3	3	Apartment
11:46	12	1	4.7	2	Apartment
11:51	13-14	2	5.2	2	Apartment
11:53	15	1	...	3	Apartment
12:00	16	1	5.9	2	Apartment
12:03	0	1	6.2	2	Call for
12:07	17	1	6.9	3	Apartment
12:12	18	1	7.2	2	Apartment
12:16	19-20	2	7.5	4	Apartment
12:24	21	1	8.3	2	Wrong Address
12:27	22	1	8.6	2	House
12:31	23	1	9.1	3	Apartment
12:36	24	1	9.6	6	Apt. C. O. D.
12:42	25	1	9.9	5	Apartment
12:48	0	0	10.1	1	Call for
12:48	26	1	10.1	4	Apartment
12:55	27	1	10.2	2	House
1:04	28	1	11.3	2	House
1:07	29	1	12.0	3	Apartment

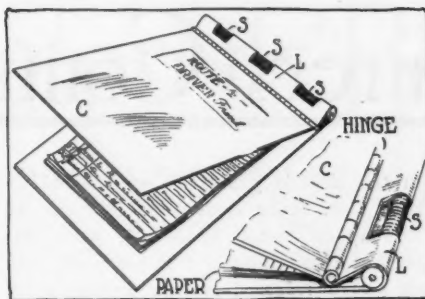


FIG. 4—DRIVER'S ROUTE BOOK

1:13	30	1	12.4	3	House
1:19	32	2	12.9	5	Not Home
1:30	33	1	14.1	1	House
1:34	34	1	15	2	House
1:41	35	1	15.7	3	House
1:47	36-37	2	16.5	3	House
1:52	38	1	16.9	2	House
1:55	39	1	17.4	2	House
2:02	40	1	18.8	1	Apartment
2:05	41	1	18.9	2	Apartment
Back at store at 2:12, distance 19.7 miles.					
Number of stops 36					
Number of packages handled 43					
Number of miles covered 19.7					
Number of C. O. D. packages 2					
Average delay at delivery stop 2 min. 40 sec.					
Average delay per package 2 min. 20 sec.					
Stops per mile 1.83					
Packages per mile 2.08					
Total delays 2 hours 6 min.					
Delivery delays 1 hour 36 min.					
Total time from start 3 hours 36 min.					
Running time 1 hour 30 min.					
Speed on road 13.1 miles per hour					
Average speed in delivery 5.47 miles per hour					

The chief delays, outside of the two C. O. D. calls, were caused by apartment house conditions. In some cases the boy



Fig. 4—From the shipping room the bundles are carried through the store to the truck by the drivers, up a flight of stairs and a distance of 300 feet, the truck waiting

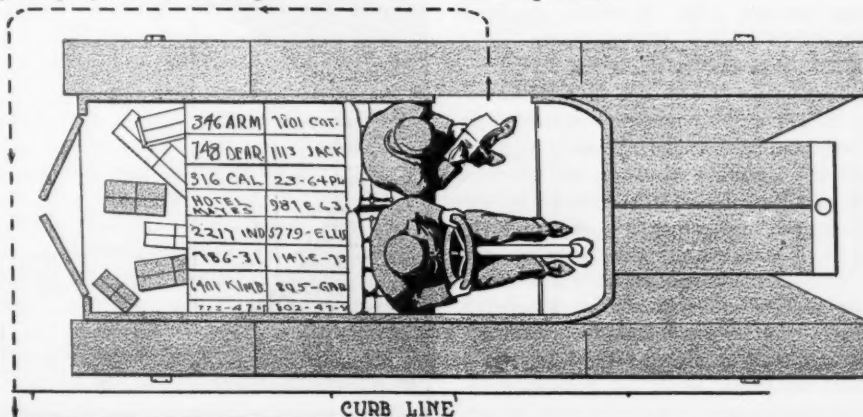


Fig. 5—Plan of car, showing packages. Dotted line shows loss caused by right-hand drive

had to mount to third floors and in every case by the system of the store he had to get his route-slip signed; every package delivered being receipted for. This caused delay in every delivery of at least 30 seconds.

An amusing feature of the trip was the delivery of a ham for a store employee who had gotten it presumably at some downtown sale and took this way to get it home without the trouble of carrying it. A boy running in another direction carried a small case of eggs, similarly.

The cost of the delivery of each package in this system is somewhat above 10 cents, but this is not high when the nature of the goods is considered, the distance covered, and the fact that the goods must be receipted for. The value of each package will probably average \$20, so that 10 cents per package is really a low figure, and 15 would not be prohibitive.

Contract delivery is growing in all cities, and will be more common as motor trucks increase in numbers. The problems of package delivery, too, are just now of great interest. The system described has points of interest to both branches, and offers many hints of procedure for other systems in other places and lines of work.

TRUCK AIDS ROAD BUILDERS

To spread oil on roads for a distance of 20 miles or more from the starting point and to spread it at a heat of 200 degrees or more would seem to be an extremely difficult undertaking, requiring a lot of apparatus and a lot of men. But by the ingenious use of a Peerless 5-ton truck the road commissioners of Los Angeles county, Cal., accomplish it with one man and one piece of mechanism.

The truck is fitted with a 1,000-gallon oil tank, and this tank is covered with a coating of asbestos 2 inches thick to retain heat. Oil is run into the tank 350 degrees Fahrenheit. Thanks to the asbestos protection and the speed the truck can make, it is possible to make a trip of 35 to 40 miles before the oil gets too cold for use.

Air pressure of 60 pounds to the square inch is maintained inside the tank by an air compressor.



Manufacturers' Communications



COMPARING LIGHTING COSTS

INDIANAPOLIS, IND.—Editor Motor Age—Referring to the editorial advice on the comparative cost of electricity and gas, on page 29 of Motor Age May 22: The figures on battery lighting while including to a partial extent battery depreciation as applying against the cost of the battery itself, do not include any allowance whatever for the fact that as the battery depreciates, its capacity depreciates.

The fact also is overlooked that in storage battery lighting, where the battery is charged off the car, the battery is charged under fairly scientific conditions. But when charged by a generator on a car, the battery receives precisely the kind of charging which makers, in their printed instructions, say it should not have. Wherefore, the assumption that a battery, charged by a generator, will live as long as the battery charged off the car, seems in urgent need of revision.

Motor Age's estimate of the amount of gasoline consumed is based on the assumption that no gasoline is being consumed except when the lights are burning, or, at least, is based on an ideal and purely theoretical notion of what is necessary to charge a battery. The fact that the generator runs whenever the engine runs, and consumes power no matter what the condition of the battery is overlooked altogether. The dead weight imposed upon the car by the electrical outfit is disregarded totally.

If the Society of Automobile Engineers is to be relied upon, Motor Age's figures as to breakage of bulbs are entirely too low. And obviously, the allowance of \$2.00 per year, to cover all repairs on the entire electrical system is indeed interesting, when compared to written statements which we have on file from motorists who have abandoned electric lighting. My own figures, based upon an average of what I know of the electrical efficiency of various lighting and starting systems, shows that the power consumption, due to the electric outfit, is in the neighborhood of 16.7 percent, with an engine rated at 25 horsepower, A. L. A. M.

I realize, as Motor Age does, however, that figures on this proposition are apt to be misleading. That my own are not absolutely accurate is shown by the fact that in a test recently conducted on the Indianapolis motor speedway, with a well-known 30-horsepower car, bearing the kind of electrical equipment which seems to be in most general use, we showed a difference of 14 percent in fuel consumption, by merely removing the driving chain so that the motor would not have to operate the electric generator. In other words, instead of \$.00004 per hour for gasoline to

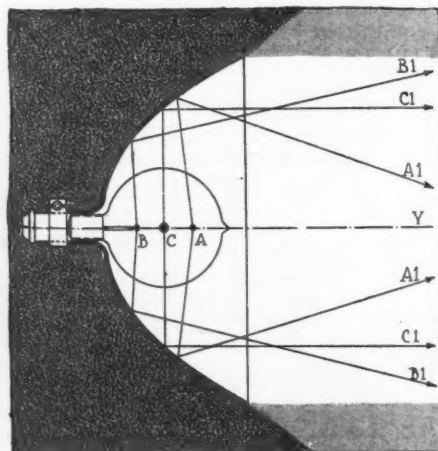
run the electric generator, we showed by actual test, under ideal conditions, on the Indianapolis motor speedway, that this cost was approximately \$.04 per hour. The test above referred to was arranged by disconnecting the main gasoline line and attaching to the carburetor a special can and pipe connections, suspended directly above the carburetor.

Then, with a measured gallon of gasoline we ran the car as far as it would go at a speed of 25 miles per hour. Then, when the fuel ran out, we disconnected the driving chain which operates the electric generator, and, with the same passenger load, same carburetor adjustment, and all other conditions identical, we got 14 percent more mileage to the gallon. This percentage would have been still further increased had we been permitted by the dealer who drove the car, not only to disconnect the electrical equipment, but also to remove its weight from the car.—R. C. Coombs, Prest-O-Lite Co.

PARABOLIC REFLECTORS

Cleveland, O.—Editor Motor Age—Now that parabolic reflectors in connection with electric lamps are coming into general use on motor cars, it may be of interest to explain briefly the principles governing the construction and use of such a reflector.

A paraboloid of revolution, which is the surface generated by revolving a parabola about its axis, is the surface used in the design and construction of parabolic reflectors. It possesses this distinguishing characteristic: All rays of light that are parallel to the axis, and which strike the inside of the surface, are reflected and pass through a common point within called the geometrical focus. Conversely, if there be a point source of light at the focus all the rays that are emitted and which strike the surface are reflected in straight lines parallel to the axis. A cross



ILLUSTRATING THE PARABOLIC HEADLIGHT

section of such a reflector is shown in the figure.

Three different and distinct results may be obtained by merely shifting the source of light along the axial line XY. These will now be considered.

Case 1. The source in front of the true focus.

This condition is shown by position A. Here it is seen that a ray of light striking the paraboloid at any point will be reflected toward the axial line, and due to the interference of the rays concentric zones of light and darkness will result. It is at once apparent that such an illumination would be very unsatisfactory.

Case 2. The source in back of the true focus.

Position B shows this condition. The rays in this case are reflected away from the axis and form practically a cone of light, entirely unsuitable for a headlight.

Case 3. The source at the true focus.

In this case the source to be considered is at C. According to our definition of a paraboloid any ray which passes through this point and strikes the reflecting surface will be reflected parallel to the axis. The result will then be a cylinder of light which will be projected straight ahead. This is what is desired of a headlight.

In whichever position the light is taken there is a certain portion that does not strike the reflecting surface at all. This light forms a cone and spreads its light upon the roadway immediately in front of the car. In the case of the source at the true focal point of the reflector—case 3—this is an advantage rather than a disadvantage. The straight beam of light thrown out ahead serves to illuminate the road for a considerable distance in advance while the light that is not reflected at all serves to give a broad general illumination.

In each of the cases considered, the source of light has been taken as a point. This point should be located at the geometrical focus to secure the most efficient results. Obviously if the light source is large in comparison with the reflector a large part of the rays will be out of the true focus, resulting in the conditions described in cases 1 and 2. This would not be utilizing the light efficiently. Therefore a point source of light should be used. The nearest approach to such a source which it is at present possible to attain commercially is the Mazda headlight lamp.

Knowing the principles of the parabolic reflector it is a simple matter to adjust the position of the lamp so that any effect ordinarily desired may be obtained. When once satisfactorily adjusted the tightening of a set screw locks the combination so that the adjustment will be permanent.

Any device may be abused unnecessarily or in some cases rendered useless by the lack of knowledge as to how it should be used. Electric headlights are very simple, but the principles on which they operate must be understood before uniformly satisfactory service can be expected—J. R. Colville, Engineering Dept., National Electric Lamp Association.



The Motorists' Bookman



The 1913 Blue Books

FOUR out of the five guide books published by the Automobile Blue Book Publishing Co., New York and Chicago, are now offered in their 1913 edition. The most noticeable feature about the books, and one which is a great improvement, is the larger sized maps which now greet one upon taking up a volume. On these maps for the eastern volumes in the mountain and lake sections a square with a narrow ben day border is shown surrounding such sections and a note informs the reader that there is a map on a much larger scale for this section on a certain page.

As in previous years the books contain abstracts of the various state motoring laws in a clear and concise manner, a list of the various steamship and ferry schedules with rates for shipping cars, detail road and city maps, the best hotels and garages are recommended, and more space has been spent in featuring the historic and local points of interest.

Volume 1, which covers the routes in New York and into Ontario with inter-volume routes extending into New England, Pennsylvania and Ohio, has six large scale lake and mountain section maps. Many of these roads have been routed anew for this year and the introductions to the various sections seem to go into road conditions and points of interest in more detail than ever before.

Volume 3 is devoted to New Jersey, Pennsylvania and the southeast and covers the famous Delaware river country, the mountains of Pennsylvania, shore resorts of New Jersey and the vast region of the southeast.

For the middle west volume 4, comprising Ohio, Indiana, Illinois, Michigan, Wisconsin and Kentucky, one will find over 45,000 miles of roadway laid out with running directions, about 20,000 miles being entirely new data gathered during the summer of 1912.

Volume 5 is the western book which covers adequately the tourable roads between the Mississippi river and the Pacific coast and the trunk line connections to Chicago. The three transcontinental lines have been brought up to date, and many important routes in Minnesota, South Dakota, Iowa, Missouri, Nebraska, Kansas and Texas have been added. There are only two states, Oregon and Washington, which are not covered. For the first time, tourists are given accurate data on the wonderful scenic sections of Colorado. No state is better known as the tourists' mecca, but until covered by the Blue Book representative last fall no information was obtainable for motor car uses. Coloradans themselves little ap-

preciate the wonders they have opened up to the motor car owners by their excellent system of conviet roads. Nothing can be more inspiring that a week among the Rockies.

Motor Car Principles

Roger B. Whitman, technical director of the New York School of Automobile Engineers, published in 1907, a work explaining the principles that underlie motor car construction and illustrating the movements and mechanical combinations adopted in every-day practice. The work was entitled, "Motor Car Principles," and from time to time there have appeared new editions revised to conform to the development of the industry. The latest edition has just come from the presses of D. Appleton and Co., New York, in the form of a 335-page book. It has been revised in the light of the latest developments, although, since the work treats more of basic principles than of particular applications, revision is more in the form of additional matter than in alteration of the original text. The work is intended particularly for the layman and the illustrations are especially well conceived.

The Flight of Birds

Following a line of research into the mysteries of bird flight, "The Flight of Birds," by F. W. Headley, is intended as a starting point for those interested in aeronautics and aviation, and to give a basis for reasoning in regard to the construction of aeroplanes on the plan of bird systems. As a discussion of the methods of bird flight, the varieties of systems of flight used by known birds and the advantages and disadvantages of each type the book is worth the study of one interested in the advancement of the latest science of man. The book contains many illustrations, mostly photographs by the author. Chapters in turn take up gliding, stability, motive power, starting, steering, stopping and alighting, the machinery of flight, varieties of wing and of flight, wind and flight, and a number of accessories to flight. The book is published by Charles Scribner's Sons, New York.

Artistic Bridge Design

Because the greatest fault of the American bridges is the lack of artistic design—a fault that might be remedied were there more literature on the subject and a better opportunity to study illustrations. H. G. Tyrrell of Evanston, Ill., a designer of 25 years' experience, has prepared the material for this interesting book in the hope that its perusal and study will produce better results. America is far behind the standards of Europe in aesthetic construction. On the continent the more important bridges are invariably designed with a view to their

architectural appearance. In this country, engineers are satisfied in designing and building structures that are perfect from the standpoint of utility and low in cost of construction without considering whether they will be an eyesore or architecturally meritorious. It is the aim of the author to assist in curbing dominant commercialism which has caused so many engineers to perpetrate so much vandalism on art. The book is a development of a series of articles on ornamental bridge construction published in the American Architect in 1901 and contains a number of designs and illustrations of ornamental bridges both in this country and Europe. The book is published by the Myron C. Clark Publishing Co., Chicago.

The Modern Gasoline Automobile

In preparing his work entitled, "The Modern Gasoline Automobile," Victor W. Page has endeavored, with success, to present the principles and practice of motor car construction to the lay reader without being submerged either by the Charybdis of technical language on the one hand, or wrecked by the Scylla of unnecessary elementariness on the other. The book is not intended as a criticism but to enable the motorist not informed regarding details of motor car building to make intelligent comparison between different forms. The up-to-dateness of the work is attested by its treatment of such subjects as stream-line bodies, sleeve-valve motors, worm-gear drive and electric lighting.

Repair hints and suggestions given for the maintenance and equipment are based on a wide, practical experience which dates from the inception of the industry as a designer, repairer and operator of motor vehicles, and should be of value to those who have not had an opportunity to become familiar with motor cars, but who can apply the experience of others. The illustrations have been prepared carefully, and for the most part the cuts detailing the construction of the various components are reproduced or adapted from actual working drawings. The work covers nearly 700 pages and is listed at \$2.50. It is from the press of the Norman W. Henley Publishing Co., New York.

Motoring in Malaya

The motorist who contemplates a tour through the federated Malay states will find the perusal of this pamphlet, written by J. H. M. Robson and distributed by the Malay States Development Agency, time well spent, since "Motoring in Malaya" contains not only the itinerary of an 11-day journey but also suggestions as to the type of car most adapted for Malay conditions, a list of fuel stations and garages, arrangements for the conveyance of the car and hints as to the personal outfit.



From the Four Winds



GOVERNORS WHO MOTOR— MANN OF VIRGINIA

ALABAMA Motor Law Upheld—After a long fight the constitutionality of the motor tax law in Alabama has been upheld. Motor car owners have spent several thousand dollars in fighting the measure.

Tent Show for Cleveland—Cleveland's first mid-summer motor car show will be the biggest ever held in the country, according to plans mapped out by Fred H. Caley, manager of the Cleveland Automobile Show Co. The two tents which have been obtained cover 3 acres of ground. The show will be given in connection with the Forest City fair at North Randall the last week of August.

Can't Hold Car for Bill—The Texas appellate court had rendered a decision to the effect that a garage cannot hold a motor car to force payment of a bill for repairs. The case was that of T. J. Caldwell vs. the Auto Sales and Supply Co. on appeal from Travis county. The appellant claimed he left his motor car with the Auto Sales and Supply Co. at San Antonio for repairs with the understanding that the charges should not exceed \$100. When he came to take the car out he was presented with a bill for \$196.62. He refused to pay the sum and the company brought suit for its recovery. The county court gave the company judgment which was reversed by the appellate court.

Pennsylvania Raises Fee—Pennsylvania motorists are generally interested in the motor car regulation bill, which was passed last week by the state senate in the same form as reported by the conference committee. The bill increases the rates for motor car licenses except for pleasure cars of less than 25 horsepower. This means an increase of \$200,000 annual revenue for the highway department, this money to become immediately available for road improvement and maintenance without special appropriation by the legislature. Under its provisions, municipalities and all local bodies are denied the right to fix a speed limit for automobiles. They are also forbidden to lay a tax or licence upon any car or driver. Rates for pleasure cars over 35 horsepower are increased \$5 and dealers' cars from \$5 to \$10.

GOVERNOR William Hodges Mann, of Virginia, is an advocate of the motor car as a means of traversing the highways, and but for the fact that he is just recovering from an attack of appendicitis he would have made the round trip from Richmond to the battlefield at Gettysburg, Pa., to attend the celebration there. While Governor Mann does not drive his own car, he consented to sit at the wheel of the Klinekar, so that the readers of Motor Age could have a picture of two products of Virginia in one. He enjoys rides into the country in the cool of the evening and he takes a deep interest in maintaining the splendid highways throughout the commonwealth. Governor Mann not only believes in working the convicts upon the state highways, but he believes in the great highway, the Quebec-to-Miami National highway, and in order to help along the Richmond-Washington link of that great thoroughfare he gave to the finance committee of the Richmond-Washington highway commission the \$10,000 which the federal government apportioned to Virginia for highway work. The executive believed the money would best serve all interests by helping in the improvement of that link of the highway.

Under the new regulations, in cities, cars will be permitted to gather a speed of 15 miles an hour and in the country the limit is 24 miles an hour.

Cleveland After Speed Germs—Three hundred and forty-six persons were arraigned in the Cleveland police court last month on charges of speeding, as a result of an anti-speeding campaign waged by two newspapers. In a few aggravated cases workhouse sentences were imposed, but most of the suits were dismissed with fines of \$5 or \$10.

Seek Canadian Reciprocity—Members of the Automobile Club of Buffalo are trying to bring about some arrangement with the Canadian government, permitting them to enter Canada with their machines and leave the dominion at any point by showing their membership cards. Through William G. McAdoo, secretary of the United States treasury, the Buffalo motorists have secured a

ruling permitting Canadian car owners to tour through New York state without taxation, and this fact will aid in obtaining a similar ruling from the Canadian authorities, it is expected.

Aurora After Scorchers—Following four motor fatalities at Aurora, Ill., twenty-five car owners whose names will be kept secret, will co-operate with the police to locate scorchers and assist in the prosecution of those who defy the traffic laws. It will be a secret service department, inasmuch as those engaged will not be publicly known.

Mexican Army After Used Cars—The minister of war of Mexico recently called for bids for the purchase of forty second-hand motor cars for use in military operations in the northern part of the country. It is stated that the motor cars are found to be of great service to the army, a large number being already in use in different localities. The order for an additional forty is being rapidly filled.

Folding Bed for Cars—A folding bed, designed to convert any five or seven-passenger car into a veritable Pullman sleeper, is being manufactured in Spokane, according to Dr. R. L. Braley, the inventor. The bed, when not in use, folds into a small roll of such size that it can be placed out of sight in the locker under the rear seat of the car. By the simple device of suspending a bed over the seats with slanting supports in the rear and straight supports in front, connecting by cords with the four springs of the machine, and by the use of a set of small pulleys to stretch the bed tight, a person can have a full length, and full width springy bed right in the car.

Dropping the Bars—Prince Edward island, one of the Canadian provinces that has been one of the few places on the globe where a motor car was not tolerated, is about to let down the bars in the near future. On that island the farmers have been successful up to now in keeping motor cars off all the roads in the entire island. Now, however, there is a law in the Canadian parliament that probably will pass, motorists believe, which will allow owners of cars to use the roads 3 days out of 7 every week. It is expected that this will allow horses to get used to cars and that later on the entire restrictions may be removed. The 3 days to be allowed are hedged with a lot of restrictions, however, so that motoring there will not be such a great pleasure for some time to come.

Haynes Gets No. 1 Tag—The new motor license law of Indiana, succeeding the old registration law, became effective July 1. Probably fifteen thousand applications for licenses have been filed. These will be filled as soon as the tags, which have been delayed in shipment, arrive. In the meantime Lew G. Ellingham, secretary of state, says there is no danger of persons who have the old registration tags and who have filed applications for licenses being arrested. For this year the motor car owners will have to pay license for only 6 months. Mr. Ellingham has announced license No. 1 will be issued to the Haynes Automobile Co., of Kokomo, on condition the company does not use the fact in any way for advertising purposes. Both the Haynes company and the Apperson Automobile Co., also of Kokomo, asked for No. 1, each claiming it built the first gasoline car in the United States. Mr.

Ellingham said that he would not attempt to solve the controversy and would allot No. 1 to the Haynes company because it applied 10 days before the Apperson company.

12,000 Cars in North Dakota—Motor car registrations in North Dakota have reached 12,000. It is believed that every car in the state has been tagged. The secretary of state is advertising for bids for 1914 tags.

To Test New Ohio Law—President Charles C. Janes, of the Ohio State Automobile Association, has named three prominent attorneys to have charge of the proceedings to test the Warnes motor law, passed at the last session of the legislature. The Warnes law, which becomes effective January 1, 1914, provides that two-thirds of the money obtained for the state from motor car regis-

tration fees shall go to the general revenue fund. Only one-third the revenue is to be given for preservation, maintenance and construction of good roads.

No Place for Pedestrians—Pedestrians in the city of Meriden, Conn., must look to themselves when crossing the streets. The police are of the opinion that their rights are limited and they should conduct themselves in accordance with vehicular traffic and not that the traffic should be conducted in accordance with the pedestrians.

Trucks Rivals of Railroads—Competition in the matter of establishing motor truck lines is bringing about big reductions in freight and passenger rates between a number of points in western Texas. That portion of the state is peculiarly well suited for the operation of trucks, many of the towns being situated many miles from a railroad. The country is level and the roads unusually good. Both passenger and freight trucks are used. Recently a new line of this character was established between San Angelo and El Dorado, 50 miles, in competition with an older line. The new line cut the passenger fare to \$1.50 for the one-way trip, a reduction of \$2.50.

Sane Control of Speeding—The sheriff of Milwaukee county, Wis., has announced that all motorists must observe the county speed limit of 25 miles an hour hereafter. Due to foolish driving by irresponsible motorists and cyclists, the sheriff says he can no longer tolerate higher speeds. It has been customary to give drivers a leeway of 5 miles an hour and no one was halted who drove below 30 miles an hour. Four additional mounted deputies have been placed on daily duty, making ten who are now watching for speeders. The practice of some deputies in getting drivers into traps is frowned upon by the sheriff, and while none of the mounted deputies will be uniformed, they will under

no circumstances be permitted to draw drivers into contests in order to make them exceed the speed limit innocently.

France Favors Reciprocity—It is stated at the department of state that the French government, through Ambassador Jules Jusserand, is making arrangements for international motor car regulations, with a view to effecting definite reciprocal touring relations between the United States and France. All operators, owners and chauffeurs desiring to motor in France are obliged to demonstrate their ability to drive a car through the most congested and intricate points in street traffic and in and out of narrow alleys. It is the desire of the French minister of public works to simplify and expedite these formalities as far as possible.

Good Roads Brevities

A NEW highway to be second to none in the state has been decided upon to connect Nashville and Chattanooga, Tenn. July 4 more than 100 representative motorists from the two towns met at Athens, the half-way point, and made final arrangements for raising the money, which must be added to the county and state funds to secure the high grade of road desired.

A big state convention is being planned by the Pennsylvania Motor Federation to be held in Harrisburg in September, in the interest of good roads. The federation will ask the use of the hall of the house of representatives and the whole subject of highways in Pennsylvania will be discussed. All motor clubs will be asked to send delegations and the public generally will be invited to participate.

The adoption of the Tice good roads bill has stimulated highway improvement all over Illinois. The highway commissioners of Middleport township in Iroquois county have commenced the construction of a half-mile of macadam road north of the river bridge at Oldtown to connect with a half-mile built some years ago. The voters of Erie township, Rock Island county, by a decisive vote decided to authorize a \$5,000 bond issue, the money to be expended for good roads. It is planned to use the major portion of the money in improving the Rock river valley route which passes through Erie and Hillsdale.

At a meeting of the good roads committee of the Clinton Commercial Club it was decided to offer \$100 in prizes for the four best 1-mile sections of road dragged in Clinton county, Iowa, this year. The prizes will be divided as follows: \$50, \$25, \$15 and \$10. New road now improved with gravel will be eligible.

The Cannon Ball trail between Chicago and Kansas City, via Aurora, Galesburg, Kewanee and Quincy will be completed by September. Most of the money to finance the improvement of the road has been subscribed and the posts marking the line of the road will be in position by August. About \$2,000 will be required to mark the poles and erect the signs and \$1,200 of this already has been paid in. Quincy is the heaviest contributor, subscribing \$700. Thomas N. Beatty of Quincy is secretary of the Cannon Ball Trail Association.

There is a merry competition on between the supporters of two routes for tourists between Chicago and the Tri-Cities, Davenport, Rock Island and Moline. The Tri-City Ocean-to-Ocean Highway Association has voted to vote upon the two roads submitted, the majority vote to rule. The one receiving the largest number of ballots will be known as the official route of the association. One of the routes is known as the Rock river valley and the other the Mississippi river scenic.

Recent Club Activities

THE Cleveland Automobile Club was host July 3 to 3,000 orphans. The children were taken in 500 cars from the various schools and asylums on a tour of the city, through the parks and to one of the beaches, where refreshments were served.

The Saline County Motor Club was incorporated last week, the object being to promote good roads and for educational purposes. The headquarters of the club will be at Harrisburg, Ill. The incorporators are C. D. Midkiff, Mark Smith, and John R. Jackson.

Ground was broken July 4 for the club house of the Dallas Automobile Club, of Dallas, Texas. Car owners from all parts of the county were present. The new club house will cost \$15,000.

The first anniversary of the York Motor Club was celebrated last Saturday afternoon and evening at the clubhouse along the Wrightsville pike, just east of York, Pa.

The annual outing of the Massillon Automobile Club, of Massillon, Ohio, was held at Brady, Ohio, June 29. The members of the club to the number of 150 made the run to Brady by way of Alliance and Ravenna.

The directors of the Worcester Automobile Club at its last meeting outlined plans for the benefit of its members and all motorists who visit Worcester, Mass. All the main thoroughfares leading into the city will be properly signboarded. The matter of a public parking space somewhere in the center of the city is to be agitated with the chamber of commerce, and a reliable information bureau is to be started.

The newly organized Kittitas Automobile Club of Ellensburg, Wash., held a successful 1-day trip to Lake Kaches and return. The trip was made by upwards of fifty of the club members.

The Concord, Mass., Automobile Association was formed last week by Secretary James Fortesque of the Massachusetts State A. A. and the following officers elected: C. F. Edgerton, president; E. A. Barker, vice-president; R. F. Hoyle, secretary-treasurer; Dr. J. Barker and C. H. Pepper, directors.

Under the direction of President Lewis R. Speare of the Massachusetts State A. A. the Cambridge, Mass., Automobile Club was formed last week. It starts out with the following officers: Henry W. Beale, president; W. G. Renwick, vice-president; F. Shirley Boyd, secretary-treasurer; F. H. Norris and C. S. Bishop, directors.

During the past week the Centralia Automobile Club was organized in Washington, with a charter membership of thirty-one. D. F. Davies was elected president; Abe Flewelling, vice-president; E. H. S. Mulder, secretary-treasurer, and G. B. Mason, David Livingstone, L. E. Titus and M. E. Johnson, directors.

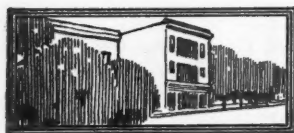
Coming Motor Events

July 12—French grand prix.
July 12-13—Track meet, Seattle, Wash.
July 11-19—A. A. endurance run, Minneapolis to Glacier Park, Mont.
July 18-19—Track meet, Peoria, Ill.
*July 21-25—Reliability tour, Grand Rapids, Mich.
*July 28-30—Galveston, Tex., beach race.
August 4—Grand Prix road race at Le Mans, France.
July 1—Indianapolis to Pacific coast tour;

CONTESTS

September 9—Corona beach race, Cal.
September 1—Track race, Columbus, O.
September 13—Track race, Grand Rapids, Mich.
September 21—French light-car road race, Boulogne.
September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.
October 4-11—Chicago Motor Club's Around Lake Michigan reliability.
*November 24—Vanderbilt road race at Savannah, Ga.
†November 27—Savannah grand prix.

*Sanctioned by A. A. A.
†Sanctioned by A. C. A.
Shows
October 17-27—Paris show.
November 7-15—Olympia show.
January 24—Chicago show.
August 30-September 6—Reliability run, Chicago Motor Club.
August 12—Kansas State Automobile Association endurance run to Colorado Springs.
August 18-22—Fourth annual Wisconsin reliability tour.
August 29-30—Elgin road races, Chicago Automobile Club.
promoted by Indiana Automobile Manufacturers' Association.
August 9—Road races at Santa Monica, Cal.



Among the Makers and Dealers



GFRORER Alco Service Manager—J. F. Gfrorer has been appointed manager of the Alco general service department. He took up his new duties July 1.

Diebold-Peters Change Name—The name of the Diebold-Peters Co., of Cleveland, O., maker of interchangeable motor car units and parts, has been changed to the Peters Machine and Mfg. Co.

Firestone Increasing Plant—H. S. Firestone, president of the Firestone Tire and Rubber Co., Akron, O., announces that building is under way which will increase the capacity of the plant fully 50 per cent. The power plant is being doubled.

More Equipment for Columbiana—The stockholders of the Columbiana Rubber Co., of Youngstown, O., have voted to increase the capital stock from \$100,000 to \$500,000. A large part of the increased capital will be applied to building and equipment.

Studebaker Seeks Branch Site—The Studebaker Corp., of Detroit, is seeking a location on the B. & O. S. W. railroad in Ohio or Indiana for a factory or storage plant. An effort is to be made by the Columbus board of trade to secure this plant for that city.

General Motors Sales Heavy—Gross sales of General Motors Co. for May exceeded all former records for that month with a total overturn of \$10,646,162. For May, 1912, gross business was \$9,987,220, but the 1912 figures did not include business of a certain subsidiary which this year added \$612,833 to the May total.

Jumbo Hide for Moon—The largest hide that has ever been imported into the United States was received last week by the Moon Motor Car Co. The hide contains 87½ square feet. It measures 11 feet in its greatest length and the greatest width is 9 feet. The hide came from France where the largest hides in the world are produced today.

St. Louis Cleveland's Rival—Due to tremendous increase in the output of the Moon Motor Car Co. and the Dorris Automobile Co. and the activities of the Business Men's League, St. Louis has taken fourth place in the motor car manufacturing business of the United States and is crowding Cleveland for third place, according to claims of Mound City boosters.

Electric Car for Los Angeles—The new electric car to be built in Los Angeles will be called the Beardsley electric, named after Volney S. Beardsley, of the California Automobile Co. John T. Shannon, electrical engineer for the company, has been designing an electric car and great claims have been made for long mileage. The company will build a one-style chassis that will accommodate three types of bodies—roadster, victoria and coupe.

Wheel Factory for Antigo—The Holland Flexible Auto Wheel Co., of Antigo, Wis., is engaged in making up a number of sets of its flexible wheels for demonstration purposes and at the same time is making tentative plans for a factory at Antigo. The wheel is designed by Thomas J. Holland, who has been working for 2 years to produce a substitute for the usual motor car wheel and one that can employ solid tires, thus overcoming the principal expense of motoring. The spokes are of steel, shaped like bows, the resiliency permitting the hub to accommodate itself to the shocks of the road. As the lower spokes take up the

shock by bending, the upper set tends to straighten out in response to the motion imparted by the hub.

Miller Doubles Capital Stock—The Miller Rubber Co., of Akron, Ohio, has filed papers with the secretary of state increasing its capital stock from \$1,000,000 to \$2,000,000.

Moon Output Car an Hour—The Moon Motor Car Co., of St. Louis, announces that an output of a car an hour has been reached by the factory. This speed will be maintained as long as the present demand continues.

Milwaukee Engineers Organize—A Milwaukee section of the American Society of Mechanical Engineers has been organized, with Fred H. Dorner, chief engineer of the Power Improvement Co., as chairman. Permanent organization will be effected late in July. All Milwaukee members of the Society of Automobile Engineers are members of the new section, the organization of which has revived interest in the plan to organize a local section of the S. A. E.

Another Factory for Indianapolis—The Smelser Engine and Machine Works which was recently organized in Indianapolis with 50,000 capital has decided to locate at Mars Hill, a suburb just west of Indianapolis. Plans are now being drawn for a factory building of concrete and brick construction. The plant will be completed about November 1. A 4-acre tract has been acquired. The company has organized with the follow-

ing officers: E. G. Ritchie, president; James M. Smelser, vice-president; Guy M. Churchill, secretary and Noble H. Wible, treasurer.

Sacks with Gray & Davis—Clarence O. Sacks, for many years president of the Rowland Advertising Agency, resigned July 1 to become advertising manager of Gray & Davis, Inc., of Boston.

Henderson to Sell Common Stock—At a recent meeting of the stockholders of the Henderson Motor Car Co., of Indianapolis, it was voted to sell the remaining unissued shares of common stock, amounting to \$100,000.

Government Buys Sanfords—Following a strenuous 6-weeks' test, a contract for thirty-four motor trucks at a total cost of \$75,000 has been signed and sealed by the United States postal authorities and the Sanford Motor Truck Co. The trucks will be used in the New York postal service.

Drawback on Studebaker Cars—The regulations of the treasury department of June 3, 1913, providing for the payment of drawback on motor cars manufactured by the Briggs-Detroit, with the use of castings made from imported aluminum by the General Aluminum and Brass Castings Co., of Detroit, have been extended to cover motor cars designated as model 25, manufactured by the Studebaker Corp., of Detroit, with the use of castings made from imported aluminum. The Studebaker Corp. will also be



CLEARING UP RUNNING BOARDS

IN contrast to the methods in vogue only recently when a motor car owner figured his car more attractive because of profuse equipment scattered along the sides and rear of the machine, makers now are firm advocates of the "clean-up" movement. Several have placed the tires in special holders at the rear of the car, but have failed to remove the tool-box on the running board. The Lozier company has solved the difficulty on the new series of light sizes now being turned out at the Detroit factory. Several compartments have been constructed in the apron directly alongside the running board for tool-carrying purposes. The tool compartments when closed cannot be distinguished at a distance of 10 feet from the car, and are in the most accessible place possible, when tire repairs are needed. This also obviates the necessity for passengers leaving their seats as is the case when the tools are kept in compartments under the cushions. All Lozier cars are now equipped with patent tire carriers and the running boards are thus kept free of all impediments.

allowed drawback on motor cars known as models 5 and 6 manufactured with the use of imported ball bearings.

Austin Leaves Mals Truck—F. A. Austin resigned as general manager of the Mals Motor Truck Co. July 1, and has moved from Indianapolis to Detroit. He is not ready to announce his future plans.

Goodyear Service for Dealers—The Goodyear Tire and Rubber Co. of Akron, Ohio, has installed a dealers' service bureau to secure road signs for dealers at rock-bottom prices by the bunching of orders and buying from a central point.

Keetons in South America—William H. Knox & Co., Inc., of Buenos Ayres, Argentine republic, has concluded an agency proposition with the Keeton Motor Co. for Argentine. This company maintains an office in the White Hall building, New York city.

To Make Motor Car Parts—The Merchant & Evans Co. of Philadelphia, which has recently opened its new tin works at Wheeling, W. Va., and rebuilt its Philadelphia factory, has added a department for the manufacture of motor car parts and accessories, including clutches, alignment joints and pressed steel tire cases.

Peete to Rest on Ranch—Friends of R. C. Peete, recently appointed manager of the Michigan branch for the Rayfield carburetor makers, will be grieved to learn that his physicians have ordered him to go west for his health. As soon as relieved, he will go to Colorado, where he will rest on his ranch near Grand Junction.

Canadian Plant for Goodrich—The Goodrich Rubber Co. has secured a tract of land on Chippewa Creek, 1 mile inland from Niagara river, on which it proposes to construct a large factory. The site was purchased from the Ontario Power Co., which will supply the plant with electric power. Within a year 1,800 workmen will be employed in the plant.

Pullman Has Birthday Party—Coincident with the fiftieth anniversary celebration of the battle of Gettysburg last week, the Pullman Motor Car Co., of York, Pa., celebrated its tenth anniversary. Open house was observed at the plant all week and ornamental signs bearing the words, "York, the Home of the Pullman Car," were posted along the highways for 50 miles.

Edwards May Go to Louisville—Efforts to interest Louisville capitalists in the Edwards-Knight Motor Co., which is now situated at Long Island City, N. Y., are being made by Charles G. Stoddard. It is said that the company already has decided to move from its present location, and it is understood that Mr. Stoddard is anxious to have the plant located in Louisville.

To Make Columbus Electric—The Columbus Electric Vehicle Co., incorporated with an authorized capital of \$50,000 to manufacture and deal in motor cars and trucks, will soon organize and locate a factory in Columbus. The prime movers of the new concern were formerly in the management of the Columbus Buggy Co. Charles E. Firestone was secretary and O. H. Perry treasurer of the defunct company. For the time being the concern will confine itself to the manufacture of electric pleasure vehicles.

Warren Auction Sale Cancelled—The auction sale of the plant and equipment of the Warren Motor Car Co. to the Rands Mfg. Co. at Detroit, June 26, was cancelled at a hearing in a Detroit court last week and the property was ordered resold. Before the sale can be made, the property must be advertised for 4 weeks. The difficulty over the cancelled sale resulted from a late bid from the Peter Smith Heater Co., of Detroit, which was higher than the purchase price of \$14,600 the Rands company was to pay.



FRENCH HAVE MOTOR ARMY KITCHEN

IN the gradual elimination of the horse from army services, the motor camp kitchen has come along to supplant the old type of vehicle drawn by horses. The new motor kitchen for the French army is built on one of the Peugeot 2-ton subsidized chassis having the motor under a bonnet in front and final drive by side chains. On this chassis is a platform body with roof carrying two big steam-heated vats, one being intended for making coffee, and the other for soup. The capacity is sufficient for 250 to 300 men. The necessary coal or wood for heating purposes is carried on the truck, the smoke being carried away through a central chimney passing through the roof. In the forward portion of the main body are lockers for housing buckets, coffee, meat, and vegetables. As the sides of the van are hinged, they can be brought down so to form a very convenient table for preparing the ingredients to be used in making the soup. The change from horse to motor kitchen has become necessary owing to the speeding up of the entire army service. All meat now is carried on motor vans and can be brought to the troops, when on active service, fresh every day. It was necessary that there should be an equally quick service for the kitchens. The Peugeot kitchen will be given its first prolonged test in this year's army maneuvers.

Recent Incorporations

Amesbury, Mass.—American Clutch Co., capital stock, \$10,000; to manufacture parts; incorporators, H. R. Nutting, F. R. Whitchee, W. H. Taylor.

Bowling Green, O.—Modern Motor Car Co., capital stock, \$1,000; to manufacture and deal in motor cars; incorporators, W. P. Albey, D. I. Ladd, R. E. Ladd, J. A. Walker, T. E. Moore.

Bremen, O.—Bremen Garage Co., capital stock, \$10,000; to operate garage and conduct general repairshop; incorporators, A. E. Godfrey, E. A. Hufford, A. D. Hufford, H. D. McCandlish, M. L. Campfield.

Cincinnati, O.—Commercial Motor Car Co., capital stock, \$50,000; incorporators, B. A. Hoelscher, E. H. Hoelscher, E. H. Hoelscher, W. G. Vosler, G. Schorr.

Cleveland, O.—Overland Garford Sales Co., capital stock, \$10,000; to manufacture and deal in motor cars; incorporators, M. Bridgman, R. R. Scott, G. F. Russell, H. O. Fitch, C. M. Ackerman.

Columbus, O.—Columbus Electric Vehicle Co., capital stock, \$50,000; to manufacture and deal in motor cars, trucks, etc.; incorporators, O. H. Perry, D. N. Perry, W. C. Neff, C. E. Firestone, T. B. Sellers.

Columbus, O.—Uhrlandt Has Generator Mfg. Co., capital stock, \$100,000; to manufacture and deal in gas machinery; incorporators, D. N. Hyman, O. C. Phillips, H. D. Shepard, A. Uhrlandt, S. Esswein.

Dayton, O.—Dayton Bulck Co., capital stock, \$10,000; to deal in motor cars, trucks, etc.; incorporators, L. J. Haughey, Charles Abel, J. A. McKenny, E. Simon, A. J. Smith.

Dedham, Mass.—East Dedham Garage, capital stock, \$5,000; directors, H. H. Bonnemort, C. J. Bonnemort, I. M. Bonnemort.

Georgetown, Del.—Georgetown Garage & Supply Co., capital stock, \$10,000; incorporators, L. P. Faucett, J. W. Faucett, E. W. White.

Indianapolis, Ind.—Merchants' Garage, capital stock, \$15,000; garage business; incorporators,

C. S. Shotwell, M. J. McGarr, H. H. Rice, W. A. Atkins, B. D. Christian, C. W. Dicks, C. P. Marshall.

Louisville, Ky.—W. P. Smith Auto Repair Co., capital stock, \$10,000; incorporators, W. P. Schmidt, G. R. Schmidt, P. A. Deck.

Millford, Conn.—Askam Rubber Co., capital stock, \$150,000; incorporators, W. F. Askam, I. W. S. Hawes, L. Askam.

Newark, N. J.—Auto Maintenance Co., capital stock, \$10,000; general motor car business; incorporators, B. A. Kelly, C. Kelly, J. E. Anderson.

New York—Standard Purchasing Co., capital stock, \$10,000; incorporators, H. L. Cook, H. F. Dexter, W. H. Brooks.

New York—G. B. Sales Corp., capital stock, \$5,000; to deal in motor car accessories; incorporators, E. E. Reardon, F. J. O'Grady, I. V. W. Williams.

New York—Gray Pneumatic Gear Shift Co., capital stock, \$1,000,000; to manufacture motor cars and parts; incorporators, F. R. Hansell, G. H. Eastburn, E. Roberts, J. M. Willis.

New York—Leasure Auto Safety Disk Co., capital stock, \$150,000; incorporators, M. M. Edmundson, H. L. Norwood.

New Haven, Conn.—W. A. Maynard Co., capital stock, \$25,000; motor car business; incorporators, W. A. Maynard, H. Marlin, C. P. Foote.

Portland, Me.—South Bend Spring Wheel Co., capital stock, \$500,000; to manufacture and deal in wheels; incorporators, A. F. Jones, T. L. Croteau.

Salem, Mass.—Witch City Auto Co., capital stock, \$7,000; directors, E. Cook, C. A. Cook, W. H. Church.

Toledo, O.—Engle Auto Parts and Motor Mfg. Co., capital stock, \$75,000; to manufacture motors and accessories; incorporators, W. P. Engle, T. T. Betts, S. W. Rapp, W. R. Engle, R. T. Betts.

Wilmington, Del.—Lamb Engine Co., capital stock, \$50,000; to build gasoline engines and generators; incorporators, H. E. Latter, W. J. Maloney, C. J. Reichard.

Wilmington, Del.—Easy Starter and Speeder Co., capital stock, \$50,000; incorporators, H. E. Latter, W. J. Maloney, O. J. Reichard.

Youngstown, O.—Huffman Mfg. Co., capital stock, \$10,000; to manufacture and deal in non-skid tire protectors for trucks; incorporators, E. S. Walton, W. B. Hall, H. H. Stambaugh, R. Garlick, J. T. Harrington.

The Accessory Corner

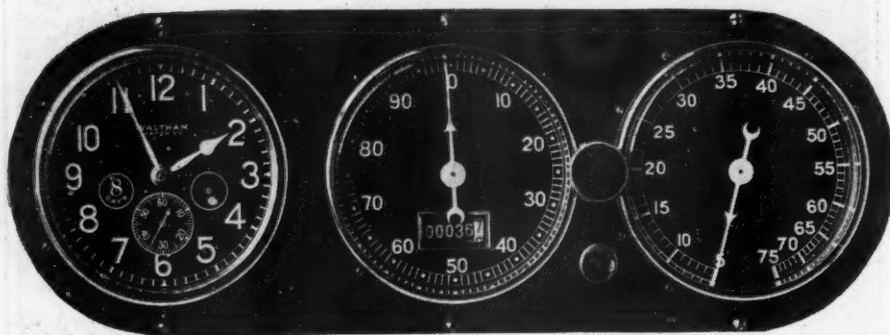


FIG. 1—HOFFECKER ELECTRIC ODOMETER

Hoffecker Electric Odometer

THE Hoffecker Co., Boston, is making deliveries to builders of electric passenger cars of its electric odometer, which resembles a speedometer excepting in that it measures distances traveled, these being registered on a circular dial the same as speeds of travel are indicated on a speedometer. The dial reads to 100 miles, the reason being that the capacity of battery on one charge is generally lower than this. In the bottom of the dial space is a season odometer for 100,000 miles.

This instrument, being the first of its kind to be marketed, is a neat one with a 3-inch dial which is black enamel with white letters and a white pointer or indicator hand. The bezel or casing for it is mounted on a small circular bracket that is screwed to the dash, the casing threading into a socket in the center of the bracket. The casing is finished in black enamel and is 16 inches thick.

The odometer mechanism is driven through a flexible shafting, the same as a speedometer, this shafting being of standard Hoffecker construction and made up of seventeen strands of flexible piano wire. The gearing between the shaft and the road wheels is such that the shaft makes 180 revolutions per mile. In that many electrics use solid rubber tires exclusively, the shafting has been mounted so as not to be influenced by the additional vibration.

The Hoffecker Co. is now marketing its combined speedometer, odometer and time-piece, shown in Fig. 1, all mounted on a special oblong-shaped bracket 10 1/4 inches in length. All three of the instruments are made with a 3-inch dial, the small diameter of these being the reason for mounting the speedometer in one bezel without anything else; and mounting the odometer with its trip and season recorders in a separate bezel. The trip odometer reading to 100 miles has the figures in a circle around the dial, with tenths and hundredths shown at each side of the hand pivot and the 100,000-mile season odometer

in the 6 o'clock position. Between the odometer and speedometer bezels are two buttons, the lower one a release and the top one a reset button. The flexible shaft drive is connected horizontally at the right end, from which point it is intended to be carried horizontally to the side of the body. The bezel of each instrument is finished in white nickel and carries a black porcelain dial with white enamel letters. The time piece is an 8-day Waltham movement.

A. V. Shock Absorber

The A. V. shock absorber introduced recently into America from France, by

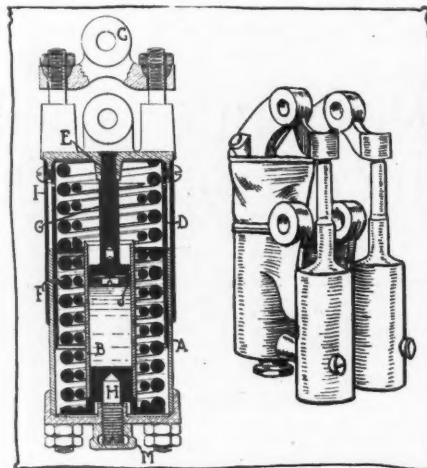


FIG. 2—TWO TYPES OF A. V. SHOCK ABSORBERS

the Hudson Export and Import Co., New York, operates on a combina-

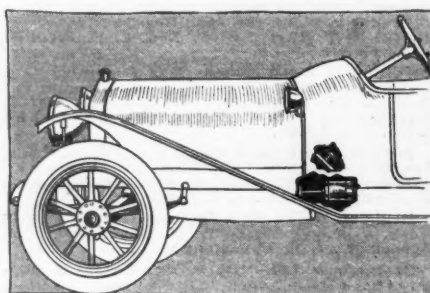


FIG. 3—APPLICATION OF HOLT CRANKER

tion of the spring and hydrostatic principles. Two types of A. V. shock absorbers are offered, one for the front of a motor car and the other for the rear. In Fig. 2 is shown a cross-sectional diagram of the rear type and an outside view of the front type. The principle in both is the same.

Referring to the illustration at the left it will be noticed that the shock absorber consists essentially of an outer cylinder, I, and an inner sliding cylinder, A. Within the casing are two springs, F and G, the former slightly longer than the latter. The spring F is designed to take the heavy shock transmitted, and the smaller spring G acts as an auxiliary, coming into action only when the shock is excessive.

In addition to the two springs, the piston E with the leather face, J, is introduced. This piston operates in the cylinder B which has a number of holes in its sides. The cylinder is filled with castor oil. When the piston comes down the oil is forced through the holes at a certain slow rate, the same action taking place when the piston ascends. Thus the A. V. shock absorber is an absorber with two auxiliaries. The set screw H and nut M permit of the adjustment of the springs of the device. Attachment to the car is by means of portion C. The front type of A. V. absorber has three cylinders, as may be seen from the illustration at the right of Fig. 2.

Holt Electric Cranker

Milwaukee, Wis., is responsible for another motor car product, this time the Holt Electric Co., coming forward with an electric motor for cranking. The maker claims extreme simplicity for the product, which is made up of four units, and may be disassembled by the novice without fear of putting the cranker out of commission. The cranking motor is of the four-pole type, series wound and operating at 6 volts. It is stated that in operation it will spin a motor from 75 to 125 revolutions per minute. The cranker is shown in position on car in Fig. 3 and the unit in Fig. 4. The latter is 7 inches

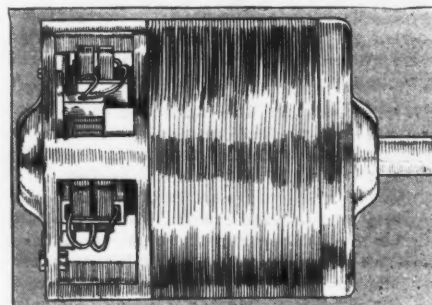


FIG. 4—HOLT CRANKING MOTOR

in diameter and 7 inches long and weighs 34 pounds.

Roller Bearing Universal Joint

The motor car universal joint must allow for a certain amount of end slip in the propeller shaft due to its differences of angularity on account of the various vertical positions of the rear axle with respect to the frame of the car. To take care of this slip, the end of the shaft usually is squared and works back and forth in a squared hole in the arm of the joint. On heavy cars, this has sometimes proven unsatisfactory due to the large torsional strain.

To eliminate this weak feature and to reduce friction to the minimum, the Michigan Auto-Joint Co., Grand Rapids, Mich., comes forward with a type of universal joint which utilizes roller bearings and is said to eliminate all of the shaft end twisting strain by placing the slip inside of the joint itself and on the roller bearings.

Fig. 6, lower, is a phantom view of the joint showing how the roller bearings are mounted. One arm is flanged to fasten to the shaft in the type here illustrated. Fig. 6, upper, gives an idea of the two center blocks, which are identical, working at right angles, so that universal action may be obtained. These center blocks C are so assembled that they have no motion relative to each other except a slip motion which tends to pull them apart. In other words, they amount to the same thing as the cross or spider of the conventional joint so far as rotation is concerned.

But, instead of the plain bearings on the ends of the ordinary universal cross on which the forked ends of the shaft partially rotate in order to give universal rotary motion, this motion is obtained in the Michigan auto-joint by the oscillation of the arms A, on the roller bearings, which are in turn free to oscil-

late through a certain angle with respect to the center blocks.

As shown, the roller bearing retainers R are partial circles, and their rotative motion is limited by the length of the slots S, which surround the pins P attached to the center blocks. The rolls in the retainers are made $\frac{1}{2}$ inch short to allow for end play and necessary slip to allow them to operate. On each side of the retaining slot, a ball bearing Y is placed, this being used since at this point a roller would be forced to slide endways due to the angle.

There are only two set-screws in the entire construction, these being used to hold the two center blocks in place. After these screws have been removed, it is a

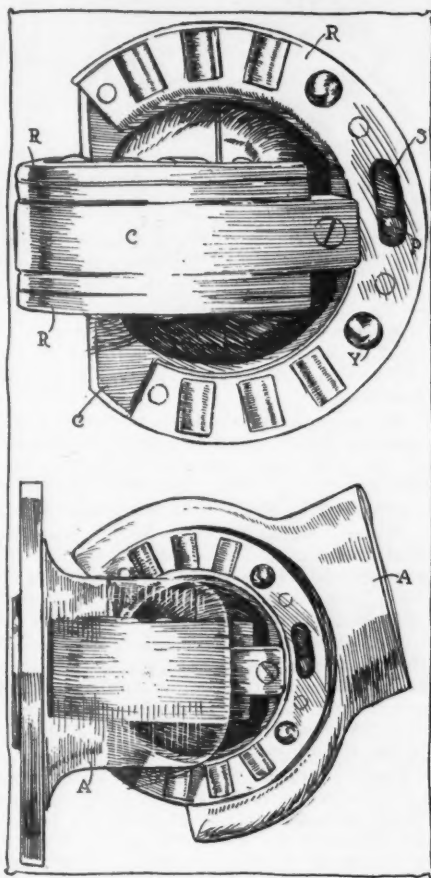


FIG. 6—ROLLER-BEARING UNIVERSAL

simple matter to pull the joint apart. To dismount further, the center block may be turned about one quarter around after which it will come out of the arm easily.

Pillsbury Auto Pull

A device which when fitted over the rear hub cap of a motor car will enable that car to pull itself out of deep sand or mud, which ordinarily would slip the wheels, is being introduced by the Pillsbury Sales Co., Minneapolis, Minn. The device comes in the form of a pulley as shown in Fig. 7, to which is attached a long rope with a hook at its end. It is attached quickly to any size and shape of rear hub. When the rear wheels of a car are deep in sand or mud, so much so that the wheels cannot gain traction the Pillsbury pull is placed over the hub cap

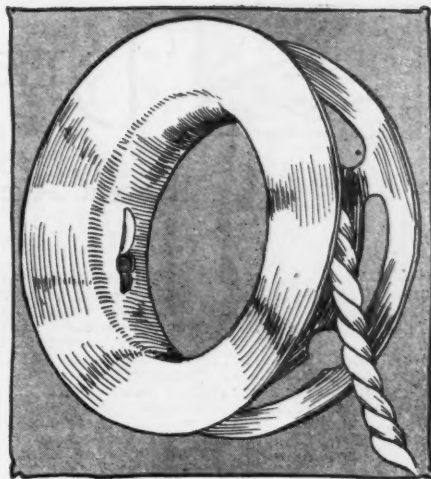


FIG. 7—PILLSBURY AUTO-PULL

of the slipping wheel and the long rope with the hook at its end attached to a stake in the ground, some distance from the car. On starting the car the wheel to which the device is attached will no longer slip, for the rope will wind itself around the pulley and thus pull the car as far as the stake. Not all makes of cars can use the same size of pull, the maker asking for a number of dimensions of hub and flange of each make of car. The Pillsbury Auto Pull sells for \$10.00. An opportunity to judge of the merits of the device may be offered during the national reliability run to Glacier park, as the pathfinder's car is expected to be equipped with it.

Carboneter Carbon Remover

Many claims are being made for a carbon remover known as Carboneter and marketed by the American Carboneter Co., Chicago, chief among which is, that it will remove carbon deposits and at the same time lubricate the working parts of the engine. The maker claims the product to be an oil which when introduced into a gas engine through the auxiliary air valve, while the engine is running, will remove carbon from the cylinders, pistons, valves and other working parts. Another claim made for this substance is that it will prevent the formation of carbon in the cylinders of a new car. The retail price is \$3.75 per gallon can, but it is offered also in half-gallon and quart cans at \$2.00 and \$1.25 respectively.

Chicago Friction Lighter

Operating like the friction cigar lighters, the Chicago friction lighter is used to light acetylene lamps without matches. The device is marketed by the American Lava Co., Chattanooga, Tenn., and may be installed on any burner having a round pillar such as is illustrated in Fig. 5. By turning on the gas and then pulling on the handle, H, quickly, a series of sparks from the point, F, come in contact with the gas and ignite it. The sparker is kept in its proper position by the tension of a spring. The sparker alone sells for \$.50 but if the lamp has no round burners the maker will supply them at \$.20.

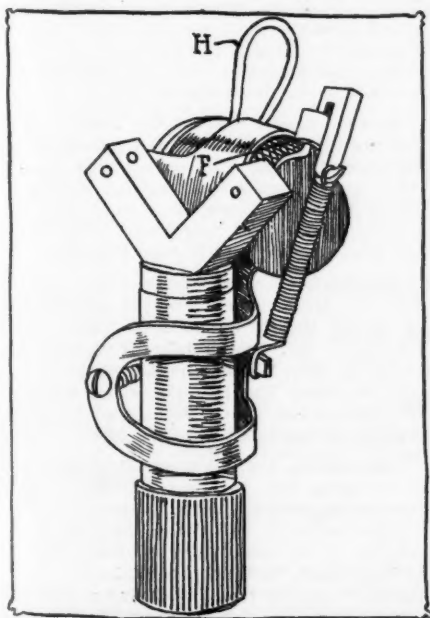
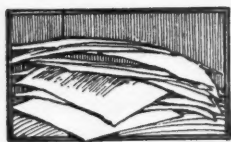


FIG. 5—CHICAGO FRICTION LIGHTER



Brief Business Announcements



Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make
Baltimore, Md.	Walter Scott	Premier
Baltimore, Md.	Model Auto Co.	Apperson
Baltimore, Md.	Chandler Motor Car Co. of Baltimore	Chandler
Burlington, Ia.	American Motor Sales Co.	Chandler
Cincinnati, O.	Chandler Sales Co.	Chandler
Cleveland, O.	Auto Sales Co.	Pathfinder
Davenport, Ia.	Davenport Automobile Co.	Keeton
Denver, Colo.	Overland Automobile Co.	Chandler
Eagle Pass, Tex.	Joseph DeBona	Chandler
Fall River, Mass.	R. W. Tierney	Chandler
Fall River, Mass.	Place Garage Co.	Franklin
Gardiner, Me.	Guy W. Lawrence	Chandler
Greenwich, Conn.	W. W. Kemble	Chandler
Hartford, Conn.	Universal Auto Co.	Franklin
Jersey City, N. J.	Burke Brothers Co.	Chandler
Kinston, N. Y.	Van's Garage	Chandler
Lorain, O.	A. V. Hageman	Chandler
Los Angeles, Cal.	Lynn C. Buxton	American

Town	Agent	Make
Los Angeles, Cal.	Grundy Co.	Cole
Manchester, N. H.	Smith & Johnson	Chandler
Morristown, N. J.	Spencer, Wilkie, Motor Co.	Chandler
Muscataine, Ia.	Bankers Auto Co.	Chandler
Newburgh, N. Y.	Van Motor Co.	Chandler
Norwalk, Conn.	F. E. Lockwood & Co.	Chandler
Paterson, N. J.	Nathaniel Fink	Chandler
Pottstown, Pa.	W. P. Young	Chandler
Red Bank, N. Y.	Stryker & Stryker	Chandler
San Francisco, Cal.	H. C. Harrison Co.	Hudson
Sharon, Pa.	W. C. DeForest & Son	Chandler
Somerville, N. J.	J. C. Henry	Chandler
South Bend, Ind.	N. L. Otis	Chandler
Stamford, Conn.	W. A. Clark	Chandler
Stapleton, N. Y.	E. Neumann & Sons	Chandler
St. Louis, Mo.	Donovan Auto Co.	Interstate
Westfield, N. J.	H. L. Fink	Chandler
Youngstown, O.	J. Ralph Seidner	Chandler

COMMERCIAL CARS

Fremont, O.	Miller Brothers Co.	Chase
Manayunk, Philadel- phia, Pa.	Manayunk Garage	Koehler

Los Angeles, Cal.	Y. R. Del Valle	Koehler
Shelby, N. C.	J. Arey	Koehler
Southampton, L. I.	J. S. Allen	Koehler

PORTLAND, Ore.—W. D. Albright has taken charge of the Portland branch of the Diamond Rubber Co.

St. Louis, Mo.—The Bagnell Automobile Co. has changed its corporate name to the Cole Motor Co., of Missouri. The management and directorate will remain the same.

Toledo, O.—P. E. O'Roark of Dunkirk, O., has invented a pump which is operated by being attached to the rear wheel of a motor car. A company is being organized to manufacture the lamps.

Cleveland, Ohio.—A. C. Weaver, formerly manager of the Lozier Sales Co., of Cleveland, has become general manager. A. W. Woodruff, former sales manager, is now manager of the Lozier branch in Boston.

Toledo, O.—The Gauntlett Auto Sales Co., Buick distributor in northwestern Ohio and southern Michigan, has moved into the three-story structure at 1014-1016 Madison avenue, formerly occupied by the Packard agency.

Toronto, Ont.—From official sources it is learned that the Russell Motor Co.'s sales from the end of its last fiscal year, were in round figures, \$2,000,000, being 94 per cent of sales to the same date last year.

San Francisco, Cal.—Arthur R. Dawson has been appointed manager of the San Francisco branch of the Lozier Motor Co., succeeding F. B. Kelp. Kelp has joined S. G. Chapman, the local Chandler agent.

Toledo, O.—H. E. Throne, Mitchell and Paige distributor, is now located in the new location at Madison avenue and Fifteenth street, for which a lease was recently closed. This structure is in the new part of motor row.

St. Louis, Mo.—The General Motors Truck Co. took possession of its new garage last week. The new building, which is of concrete, is a large structure and has attracted much attention because of its many new appliances. The public garage is capable of housing sixty large trucks.

San Francisco, Cal.—Arthur Bunker of Seattle has been made manager of the San Francisco branch of the Oakland Motor Car Co. of Pontiac. This branch was inaugurated more than a year ago under the direction of Henry L. Hornberger, the Philadelphia advertising man, who sold out his busi-

ness to take this position. Bunker has a successful motor car business of his own in Seattle, where he handles Oakland cars exclusively. He will retain this business.

Weston, O.—L. W. Parker, owner of a local garage, suffered a \$1,200 loss in the \$15,000 fire which swept the city early this morning.

Minneapolis, Minn.—A. O. Perlitz from the Chicago branch has been appointed manager of the Minneapolis branch for the Locomobile Co. of America. He succeeds M. P. Leiby, sent to Kansas City to open a branch.

Boston, Mass.—C. N. Colstad, who for some months has been one of the factory representatives of the Lozier traveling in New England, resigned last week to go with the newly organized Chandler Motor Car Co.

San Francisco, Cal.—There is an echo of the passing of the Thomas car in the action of the Thomas Flyer Co. of this city, which has changed its name to the Argonaut Motors Co. The company distributes the Abbott in northern California.

Lowell, Mass.—William A. Mason has closed a deal with D. A. McKenzie, who has taken the agency for Maxwell cars in Lowell, to take over the latter's garage and repair business at 826-836 Middlesex street, Mr. McKenzie confining himself to the selling of cars solely.

Chicago.—E. E. Hewlett, of Los Angeles, has acquired nearly all the western territory for the sale of Flat cars. Hewlett, who has been the agent in Los Angeles, has completed negotiations for the Chicago district, and now has those two cities as well as Seattle, San Francisco, and Tacoma.

Oshkosh, Wis.—The Stocum-Bronson Automobile Co. has been organized at Oshkosh, Wis., to take over the garage of Philip W. Stocum, 43-45 Ceape street. The principal owners of the company are Mr. Stocum and Leslie K. Bronson, who has for 4 years been secretary and general manager of the Oshkosh chamber of commerce and is a well-

known newspaper man. The Stocum-Bronson garage will be enlarged and much new equipment added.

Seattle, Wash.—George Evans is now manager of the Olympic Motor Car Co., of Seattle, succeeding C. W. Dansie.

Hartford, Conn.—Skinner Brothers, who have represented the Chalmers, Stearns and Woods electric in this city, have retired from business.

Baltimore, Md.—Cook & Fletcher, distributors for Stanley steam cars in this section, have opened up new headquarters at 810 Madison avenue.

Boston, Mass.—Gray & Davis, Inc., has appointed C. M. Tichenor sales engineer, covering Detroit and adjacent territory, with headquarters in Detroit.

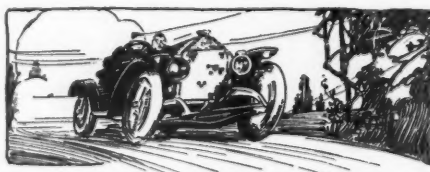
Philadelphia, Pa.—The Chicago Pneumatic Tool Co., manufacturer of the Little Giant truck, has moved from 716 Arch street to 1740-1742 Market street.

Philadelphia, Pa.—George G. Brownlee, Broad and Tioga streets, local distributor of the Hupmobile and the National, will relinquish the agency of the latter car. What concern will handle the National interests has not as yet been announced.

Seattle, Wash.—One of the largest building projects in Seattle is the garage of the Harvard Building Co. on Boylston avenue. This is the largest building devoted exclusively to motor cars in the Queen City, having one acre of floor space. The building when completed will cost \$100,000.

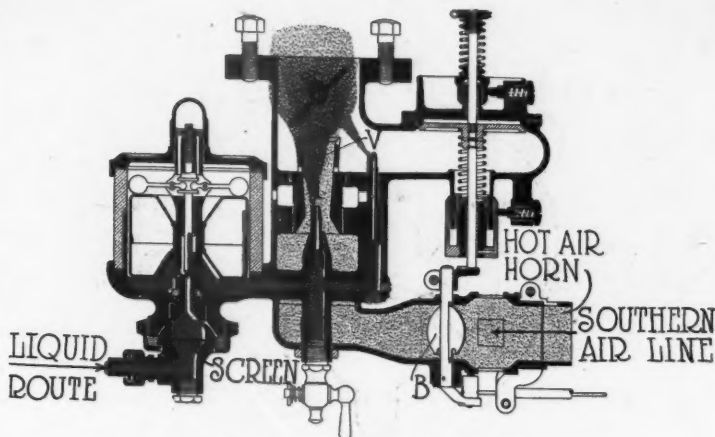
New York.—The Oakland Motor Car Co., of Pontiac, Mich., announces the appointment of W. B. Fewell, as its New York branch manager. Mr. Fewell takes the place vacated by Mr. Walte who leaves the retail field to enter the manufacturing business. Mr. Fewell has been Boston and St. Louis branch manager for the Olds Motor Works.

Indianapolis, Ind.—William H. Lee, owner of Ye Auto Inn, 20 West Thirtieth street, has let contracts for an addition, which, when completed, will make the garage the largest in Indiana. The addition will be 80 by 60 feet, making the total size of the garage 60 by 200 feet and giving a capacity for one hundred cars. The addition will be two stories high.



LITTLE JOURNEYS.

With a Drop of Gasoline through the New Type "G" STROMBERG CARBURETOR



Outline map of our Journey via the Southern Air Line

EVERY motorist knows that the wheels of his car are driven by consecutive explosions of a "mixture" of gasoline and air, fed into the motor through the carburetor. Few motorists realize, however, that upon the uniform texture—the homogeneity—of that mixture depends the power and economy of the motor. They fail to comprehend that an ordinary carburetor may make the wheels go round well enough, yet all the time be cheating the car out of 10% of its power, and padding the fuel bill, simply because it hasn't the ability to whip up an even mixture.

The STROMBERG NEW MODEL "G" may be said to act in the capacity of an infallible little chemist under the hood, measuring out *automatically*, according to predetermined and unvarying formulae, just right proportions of air and gasoline for every conceivable speed from a snail's pace through full tilt. The STROMBERG mixture is *scientifically* perfect. Every drop of gasoline is *made* to do its duty.

In our Little Journey today via the Southern or Tropical Air Line, we discover that by means of a hot air horn regular air is drawn hot from the exhaust manifold up past spray nozzle 1, making for hurry up vaporization of our present day logy, low proof gasoline.

We note that regular air coming up by the South-

ern Passage joins forces with the gasoline spraying from nozzle 1, that they combine and without broadening out or slackening in speed are shot close up to the mouth of the manifold. This because of the funnel shaped extended venturi (V). The advantage of this unique venturi construction is that the precipitation of gasoline globules on the walls of the carburetor is prevented; every drop of gasoline is driven to work up through the throttle opening. They have got to "mix." There is no alternative. Utmost power and economy is the natural result.

In winter, by closing butterfly valve (B), the regular air is strangled, the auxiliary air is choked, and as a result of the vacuum created a super-rich *priming mixture* is drawn from the two spray nozzles.

Stromberg Motor Devices Company

54 East 25th Street

Chicago, Illinois

BRANCHES

New York

Boston

Detroit

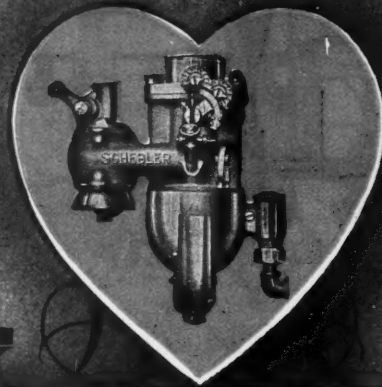
Indianapolis

Minneapolis

Pacific Coast Distributors: Chansler and Lyon Co., Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle.
Canadian Distributors: Russell Motor Car Company, Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver.

SCHEBLER

*The Aristocrat
of Carburetors*



"The Heart of the Automobile"

WHEELER & SCHEBLER

"Pioneers in Perfection" of Carburetion

MANUFACTURERS
INDIANAPOLIS U.S.A.

THE SCHEBLER IS THE ACKNOWLEDGED
STANDARD CARBURETOR OF THE WORLD

Branches

NEW YORK	DETROIT
BOSTON	DENVER
PHILADELPHIA	SAN FRANCISCO
ATLANTA	LOS ANGELES
MINNEAPOLIS	SEATTLE
KANSAS CITY	MONTREAL CAN.
CHICAGO	SIDNEY AUSTRALIA

Service Department

Distributors

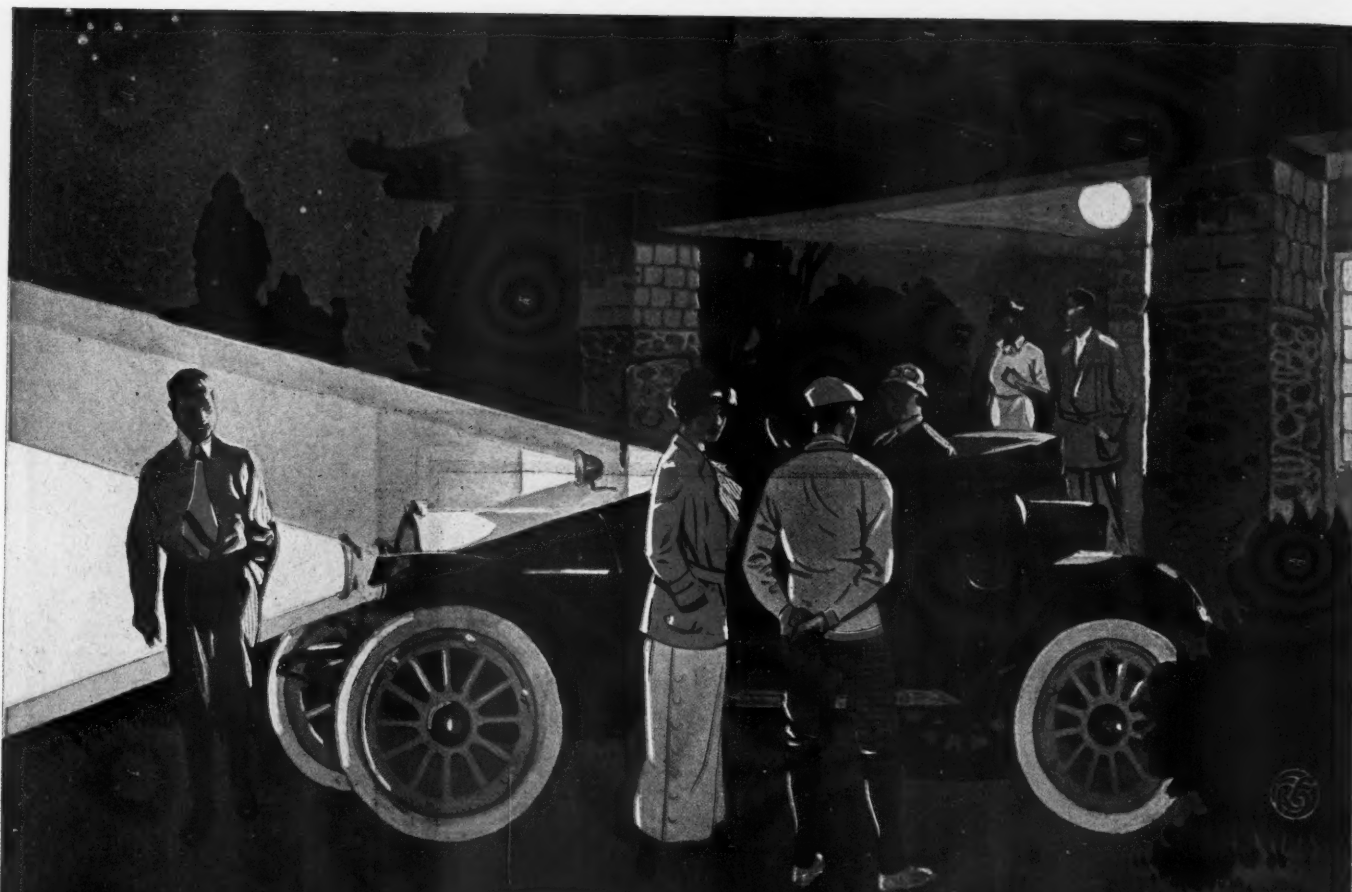
Every city and town in
the United States and
Canada • Europe and
• Australia •

9 OF EVERY TEN CARS in use today -- costing \$2500 and more—carry Klaxons.

57 car makers—including the makers of every high-grade car in America — regularly equip with them.

200,000 Klaxon users know the Klaxon is essential to motor-ing safety.

26 large cities today require the use of a signal producing an *“abrupt note, sufficiently loud to be heard under all conditions of traffic.”*



A Mercury **BAILEY** Switch Does It! **ELECTRIC SYSTEM**

Benjamin F. Bailey, the eminent electrical engineer, has made it possible at last for the purchaser to secure

a high grade starting, lighting and ignition system on a medium priced car—a system in which all troublesome devices, such as reverse current relays, magnetic switches, vibrating contacts, delicate rheostats, slipping clutches, corroding platinum points have been eliminated. A patented mercury switch does it. There are no moving parts in its system of regulation.

The illustration shows the equipment supplied with the Krit Roadster selling at \$1100.

This Krit Roadster is fitted with 3 11/16" x 4 1/4", 4-cylinder motor. Compression, 75 pounds.

The Bailey starter will turn this motor over at 120 R. P. M., which is twice as fast as the average starter on \$5,000 cars will turn.

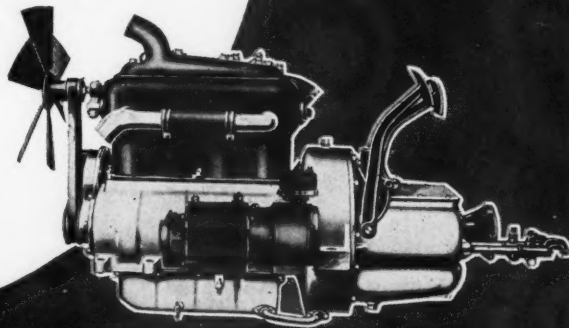
The outfit is high-grade in every respect, and it is much superior to that offered by most cars selling for twice as much. Our Book "Bailey Electric Systems and Electric Lighting Explained" will be of great interest to you. It gives details and prices.

Bailey Electrical Company
Grand Rapids, Mich.

WILSON & COSGROVE, Agents

Suite 6, Goldberg Building,
Cor. Woodward and Warren Aves.

Detroit, Mich.



Index To Automobile Manufacturers Who Have Contracted For



Storage Batteries

A	
Abbott Motor Co.	Detroit, Mich.
Adams-Lancia Co.	New York City
Allen Motor Car Co.	Fostoria, Ohio
Alpena Motor Car Co.	Alpena, Mich.
American La France Fire Engine Co.	Elmira, N. Y.
American Locomotive Co.	Providence, R. I.
American Motors Co.	Indianapolis, Ind.
Ames Motor Car Co.	Owensboro, Ky.
Apperson Bros. Automobile Co.	Kokomo, Ind.
O. Armleder Company.	Cincinnati, Ohio
Auburn Automobile Co.	Auburn, Ind.
Austin Automobile Co.	Grand Rapids, Mich.
The Avery Company.	Peoria, Ill.
B	
Bartholomew Company.	Peoria, Ill.
Benton Motor Car Co.	Benton, Ill.
Buckeye Manufacturing Co.	Anderson, Ind.
C	
Canadian Standard Auto & Tract. Co.	Fort Wayne, Ind.
Cartecar Company.	Pontiac, Mich.
J. I. Case T. M. Machine Works.	Racine, Wis.
Chadwick Engineering Works.	Pottstown, Pa.
Chandler Motor Car Co.	Cleveland, Ohio
F. Coleman Carriage & Harness Co.	Illion, N. Y.
Columbus Buggy Company.	Columbus, Ohio
Commerce Motor Truck Co.	Detroit, Mich.
Corbitt Automobile Co.	Henderson, N. C.
Crane Motor Car Co.	Bayonne, N. J.
Crawford Automobile Co.	Hagerstown, Md.
Crescent Motor Company.	Cincinnati, Ohio
Crow Motor Car Co.	Elkhart, Ind.
James Cunningham Son & Co.	Rochester, N. Y.
Cutting Motor Car Co.	Jackson, Mich.
Croxton Motor Car Co.	Washington, Pa.
D	
Geo. W. Davis Carriage Co.	Richmond, Ind.
Di Dion Bouton.	New York City
Dorris Motor Car Co.	St. Louis, Mo.
E	
Enger Motor Car Co.	Cincinnati, Ohio
Elkhart Carriage & Harness Co.	Elkhart, Ind.
F	
F. I. A. T. Company.	Poughkeepsie, N. Y.
Flanders Motor Co.	Cincinnati, Ohio
H. H. Franklin Manufacturing Co.	Syracuse, N. Y.
G	
Gramm-Bernstein Company.	Lima, Ohio
Gramm Motor Truck Co.	Lima, Ohio
Gramm Motor Truck Co.	Walkerville, Ont.
Great Western Automobile Co.	Peru, Ind.
H	
Havers Motor Car Co.	Port Huron, Mich.
Haynes Automobile Co.	Kokomo, Ind.
Henderson Motor Car Co.	Indianapolis, Ind.
Herreshoff Motor Co.	Detroit, Mich.
I	
Ideal Motor Car Co.	Indianapolis, Ind.
Imperial Automobile Co.	Jackson, Mich.
J	
Jackson Motor Car Co.	Jackson, Mich.
K	
Kelly-Springfield Motor Truck Co.	Springfield, Ohio
King Motor Car Co.	Detroit, Mich.
Kissel Motor Car Co.	Hartford, Wis.
Kline Motor Car Co.	Richmond, Va.
Knox Automobile Co.	Springfield, Mass.
Krit Motor Car Co.	Detroit, Mich.
L	
Lenox Motor Car Co.	Boston, Mass.
Lexington Motor Car Co.	Connorsville, Ind.
Little Motor Car Co.	Flint, Mich.
Locomobile Co. of America.	Bridgeport, Conn.
Lozier Motor Car Co.	Detroit, Mich.
Lyons Atlas Co.	Indianapolis, Ind.
M	
W. H. McIntyre Co.	Auburn, Ind.
McLaughlin Motor Car Co.	Oshawa, Ont.
Marathon Motor Co.	Nashville, Tenn.
Marion Motor Car Co.	Indianapolis, Ind.
Maritime Motor Car Co., Ltd.	St. John, N. B.
Martindale & Millikan.	Franklin, Ind.
Maxwell Motor Car Co.	Detroit, Mich.
Mercer Automobile Co.	Trenton, N. J.
Metzger Motor Car Co.	Detroit, Mich.
Michigan Buggy Co.	Kalamazoo, Mich.
Midland Motor Car Co.	Moline, Ill.
Mitchell-Lewis Motor Car Co.	Racine, Wis.
Moline Automobile Co.	East Moline, Ill.
Moon Motor Car Co.	St. Louis, Mo.
Motor Car Manufacturing Co.	Indianapolis, Ind.
N	
Nance Motor Car Co.	Philadelphia, Pa.
National Motor Vehicle Co.	Indianapolis, Ind.
Nordyke & Marmon Co.	Indianapolis, Ind.
Norwalk Motor Car Co.	Martinsburg, W. Va.
Nova Scotia Carriage Co.	Kentville, N. S.
Nyberg Automobile Works.	Anderson, Ind.
O	
Oakland Motor Car Co.	Pontiac, Mich.
P	
Packard Motor Car Co.	Detroit, Mich.
Paige-Detroit Motor Car Co.	Detroit, Mich.
Palmer & Singer Mfg. Co.	Long Island City, N. Y.
Patterson Wagon Works.	Flint, Mich.
Peerless Motor Car Co.	Cleveland, Ohio
Pilot Motor Car Co.	Richmond, Ind.
Pope Manufacturing Co.	Hartford, Conn.
Premier Motor Car Co.	Indianapolis, Ind.
Pullman Motor Car Co.	York, Pa.
R	
Regal Motor Car Co.	Detroit, Mich.
Renault-Freres Selling Co.	New York City
Reo Motor Car Co.	Lansing, Mich.
Reo Motor Car Co. of Canada.	St. Catharines, Ont.
Russell Motor Car Co.	West Toronto, Ont.
S	
Sayers & Scovill Co.	Cincinnati, Ohio
Schacht Motor Car Co.	Cincinnati, Ohio
Seagrave Company.	Columbus, Ohio
Selden Motor Car Co.	Rochester, N. Y.
Simplex Automobile Co.	New Brunswick, N. J.
A. O. Smith Company.	Milwaukee, Wis.
South Bend Motor Car Works.	South Bend, Ind.
Spaulding Manufacturing Co.	Grinnell, Iowa
Speedwell Motor Car Co.	Dayton, Ohio
Stanley Motor Car Co.	Newton, Mass.
Staver Carriage Co.	Chicago, Ill.
F. B. Stearns Co.	Cleveland, Ohio
Stegeman Motor Car Co.	Milwaukee, Wis.
Sternberg Manufacturing Co.	Milwaukee, Wis.
Stevens-Duryea Co.	Chicopee Falls, Mass.
Stoddard-Dayton Co. (Maxwell).	Dayton, Ohio
Studebaker Corporation	Detroit, Mich.
T	
Tudhope Motor Car Co.	Orillia, Canada
V	
Vandewater & Company	Elizabeth, N. J.
Velle Motor Vehicle Co.	Moline, Ill.
W	
Warren Motor Car Co.	Detroit, Mich.
Wayne Works	Richmond, Ind.
Webb Company.	Allentown, Pa.
Westcott Motor Car Co.	Richmond, Ind.
White Company.	Cleveland, Ohio
Wichita Falls Motor Co.	Wichita Falls, Tex.
Willys-Overland Co.	Toledo, Ohio
Winton Motor Car Co.	Cleveland, Ohio
Z	
Zimmerman Manufacturing Co.	Auburn, Ind.

Willard Storage Battery Company
CLEVELAND, OHIO

(41)

Stegeman

50 Cents for Repairs in Two Years!

IT cost The Seeger Refrigerator Co. just exactly 50 cents—outside of the usual expense for gasoline and oil—to operate a 2-ton STEGEMAN Truck for two years. Furthermore, The Continental Motor Mfg. Co. is operating a 1-ton STEGEMAN Truck at a cost of \$14.18 per 1,000 miles. Although this truck is frequently overloaded 100%, 12¼ miles to the gallon of fuel is a regular performance.

Record-breaking economy of upkeep of this kind, coupled with persistent, uninterrupted 365-day-in-the-year service, are the chief reasons that no STEGEMAN Truck has ever been traded in or sold, all being in the hands of the original purchasers—that no user has ever purchased another make truck after once getting a STEGEMAN. This year, in Milwaukee alone, STEGEMAN sales increased over 400%—3 times more STEGEMAN Trucks being sold than all other competing makes put together.

READ THIS!

Seeger Refrigerator Co.

St. Paul, Minn., Jan. 8, 1913.
Stegeman Motor Car Co.,
Milwaukee, Wis.

Gentlemen: Our Stegeman Truck is giving us excellent service. It is on the go every day, and the only expense outside of the usual ones for gasoline, oil, etc., has been about fifty cents for a new magneto pencil, and this was no fault of the truck, but that of the driver.

Very truly yours,
Seeger Refrigerator Co.
(Signed) By Walter G. Seeger,
Secretary and Treasurer.

P. S.—Show us the truck in the market that has run nearly two years, done the work that this one has, and is in as good condition as this one is.
S. R. CO.

A Few Stegeman Users

Cold dollars and cents economy in final upkeep, and consistent service such as that enumerated above, are the two reasons STEGEMAN Trucks have been purchased and are now being operated by—

THE AMERICAN EXPRESS CO.
THE STANDARD OIL CO.
THE CONTINENTAL MOTOR MFG. CO.
THE HARLEY-DAVIDSON CO.
PFISTER & VOGEL LEATHER CO.
—and hundreds of others.

Ask any of these concerns why they consider a STEGEMAN the most economical "buy"—at any price.

Points of Stegeman Leadership

The STEGEMAN was the first truck to use left-hand drive, center control, a unit power plant, and an automatic advance spark. No truck on the market today uses wear-proof bronze bushings so extensively throughout the chassis. No truck is more simple—more understandable.

We were among the first to recognize the value of enclosed chains. From the first we have been leaders where others have followed. Today we are far in advance of the generally accepted theories of truck design and construction.



It cost just 50 cents for repairs to run this Stegeman 2-ton truck steadily for two years. Read the letter on this page.



Stegeman

Dealers! You Can't Buy a Second-Hand Stegeman

THAT means that STEGEMAN Trucks *stay* sold. That means STEGEMAN Trucks never "come back" to eat up dealers' profits. A truck that will run steadily for two years with only a 50 cent outlay for repair expense is the kind of truck that **makes** a dealer, and doesn't **break** him. It is the kind of truck that **you** want to be handling if you are remaining in business for the sake of your bank account and not your health.

You can't afford to *compete* with the STEGEMAN. The statistics on the opposite page *prove* that to you. It is easier to sell the STEGEMAN than try to "buck" it.

Increased manufacturing facilities put us in a position to start a limited number of responsible dealers in a profitable business. Now is the time, during the dull summer months when pleasure car sales are slow, to drum up the truck business in your vicinity. The **right** truck agency is a source of profit, winter or summer—12 months in a year. You **can** make it the backbone of your pleasure car business.

Simply Get the Prospects

We don't ask you to work alone. You simply get the prospects—we'll help you sell them. Send us the name of every truck prospect in your town. Every two weeks every prospect will hear from us **direct**. We pave the way for you to easy sales with what is conceded to be the most effective follow-up plan ever originated.

Write for our handsomely illustrated catalog full of pocketbook facts. It is free.

The Stegeman "Travelogue"

The "STEGEMAN TRAVEL-OGUE" contains more ways for clinching a truck sale—more truck salesmanship—than has ever before been printed between two covers. It is furnished to Stegeman salesmen.

With both of us working together—you with a complete line of **self-selling** STEGEMANS, we backing you up—90% of the truck prospects in your territory should be **yours**.

READ THIS!

The Continental Motor Mfg. Co., of Detroit, purchased in March, 1912, the 1-ton STEGEMAN Truck illustrated at the bottom of this page.

One month's record of operating expense, as submitted by the Continental Co., is as follows:

Gasoline, 82 gallons.....	\$11.48
Oil, 9 gallons.....	2.70
Driver's wages.....	60.00
Total miles per month.....	988
Operating cost per mile, including driver.....	\$0.075
Operating cost per day, including driver.....	\$2.85

A letter accompanying this report reads: "This truck has received very hard usage. It has been running continuously every day, many times overloaded fully 100%. We have never had the slightest trouble."

1914—Stegeman Line—1914

It comprises 1500 lb., 1 ton, 2 ton, 3 ton and 4 ton **QUALITY** Trucks

Write for Catalog Containing Complete Specifications

Stegeman Motor Car Co.

Milwaukee, Wisconsin



It is costing the Continental Motor Mfg. Co. an average of less than 1½ cents per mile outside of the driver to operate this STEGEMAN 1-ton truck. Read the report on this page.



HOW MOSES LED THE MULTITUDE

Four years ago the Havers Motor Car Co. was organized to build what was then considered the impossible—a high grade, six-cylinder automobile at a popular price.

At the time the first Havers Six appeared there was not a single Six selling within twelve hundred dollars of the Havers price and our speedy funeral was predicted.

But the Havers organization had a new idea, a method different from anything yet undertaken in six cylinder construction.

We saw the mistakes the other Six manufacturers were making in trying to manufacture their entire car in their own plant.

We saw a tremendous non-productive investment in expensive machinery that could be kept busy but a fraction of a day.

We saw an overhead and a waste that put the Six, with all its superiority, within reach of the millionaire only.

We saw that nowhere was the old adage, "A Jack of all trades is master of none" so true as in the making of a high grade motor car.

So we drew our plans—plans that embraced all that was best in six cylinder engineering.

But instead of figuring on building the heavy, more vital parts of the Havers Six, we grasped an idea from what a few of the better Fours had just worked out to a big success, and called in a dozen of the best known specialists—men who were building single parts exclusively—men who were big enough to see the hand-writing on the wall and anxious to be the first to enter the six cylinder field.

For days and weeks their engineers and ours worked side by side—experimenting, testing, perfecting—until the first Havers Six appeared—a car so trustworthy that it is still smiling after four strenuous years and a record of many thousands of miles.

Briefly, this is the story of the Havers Six, the pioneer, the leader of the sensibly priced

sixes, the inspiration for a host of others that have followed the Havers trail, until today the popular priced Six is justly master of the market.

For we had proved our theory, that in every important part of Six cylinder construction there are certain specialists who, through a greater market and constant concentration of both their energy and capital on one product, can produce a better product for less money than can the manufacturer of a high grade car who is always confined to a limited output.

You know the record of the Havers Six, how its sales have jumped in every territory where it is represented.

While our present series of cars is practically completed, we are going to again increase our capacity and will shortly announce the season's plans. In addition to the always popular Six-44 and 5-passenger Six-60 we will make a seven passenger car and limousine. Demonstrators will soon be ready.

We will want more dealers—good dealers, who are looking for a Six—the oldest in its class, to back up their salesmanship with a car that will deliver.

If "imitation is the sincerest flattery," then we have every reason to be more than satisfied with the result of those carefully laid plans of four years ago, for the Havers trail, so courageously blazed, is already assuming the appearance of a well beaten path, and, as the pioneers of the moderate priced Six—built with specialized parts—we do not hesitate to share the credit for our success with the specialists whose names appear in the opposite page who aided us so well in pioneering this successful movement.

6-44



\$1850

Havers Motor
Port Huron,

Car Company
Michigan

HAVERS SIX ROLL OF HONOR

CONTINENTAL MOTOR MFG. CO.	- - - -	Motors
WESTON-MOTT MFG. CO.	- - - -	Axles
WARNER MANUFACTURING CO.	- -	Transmissions
A. O. SMITH COMPANY	- - - -	Frames
BRISCOE MANUFACTURING CO.	- - - -	Radiators
WARNER GEAR CO.	- - - -	Steering Gears
SPICER MANUFACTURING CO.	- -	Universal Joints
BOSCH MANUFACTURING CO.	- - - -	Magnetos
STROMBERG MOTOR DEVICES CO.	- -	Carburetors
NORTH EAST ELECTRIC CO.	- - -	Electric Starters
HESS-BRIGHT MFG. CO.	- - - -	Bearings
HYATT ROLLER BEARING CO.	- - - -	Bearings

6-60



\$2350

Havers Motor
Port Huron,

Car Company
Michigan

6 CYLINDER

UNDERSLUNG

ELECTRIC

Announcement

New Series
NORWALK
UNDERSLUNG
IV SIX IV

with
**ELECTRIC
GEAR SHIFT**

One
more reason
for its
distinction
as being
the "Car of
Absolute
Exclusiveness"

The big, powerful
Norwalk, as easy to
operate as an elec-
tric runabout

Showing
the Simple
Controls

Full Electric Control
Electric Lighting
Electric Starting
Electric Gear Shift

LIGHTING

STARTING

AND
GEAR-SHIFT

Press the Button!

Push the Clutch Pedal

This is all that is necessary to shift the gears. You can shift as fast as you can move your fingers or your foot. The use of an electric gear shifter eliminates the greatest drawback in driving the average car. It enables the weakest woman to drive the highest powered car—heretofore impossible.

Shifting gears is now as easy as switching on the electric lights. The use of the electric gear shifter provides for absolutely automatic operation. Any person with intelligence enough to press the button which indicates the speed desired—and to press the clutch pedal the same as in declutching any car—can use the electric gear shift. The most commendable feature of the Vulcan electric gear shifter is that you can always anticipate any changes. Should you, for instance, be traveling through congested traffic and decide that in a few moments a lower speed will be necessary, you merely press the low speed button and when the change becomes necessary, you simply press the pedal and the gear shifting is instantly accomplished. Or, on the other hand, if you are traveling at low speed and you decide that the reverse will be needed soon, you press the reverse button and at the right moment touch the pedal, thus easily accomplishing what would otherwise consume time and energy.

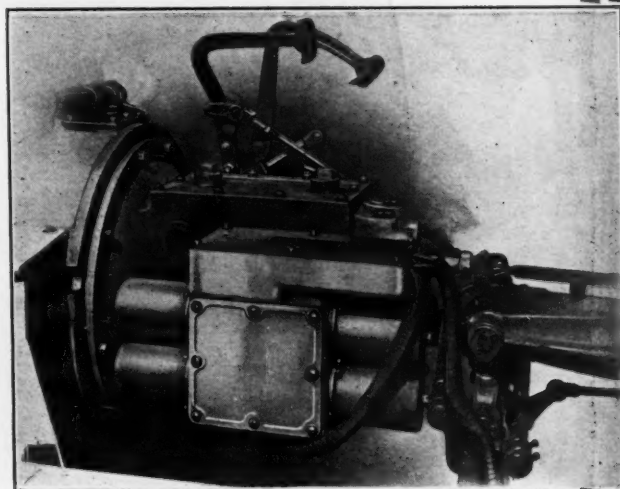
The Acme of Simplicity

The last word in simplicity has been reached in the operation of the NORWALK UNDERSLUNG SIX. The starting of the car consists in the depressing of the push button indicated by speed No. 1, and pushing out the clutch as in the ordinary operation of declutching; the gear shift does the balance. To engage the second gear, merely depress the button indicated by speed No. 2. The same operation is repeated; likewise, in the 3rd and 4th speeds.

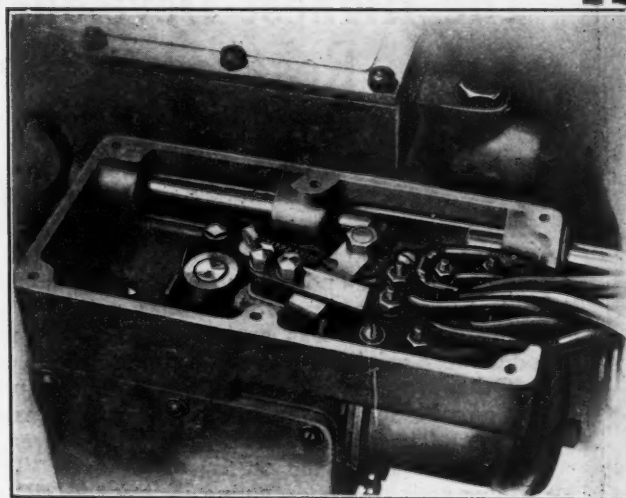
No matter at what speed the car is traveling, by pressing the button indicating reverse and pushing out the clutch as the car comes to a stop it engages the reverse gear; letting in the clutch in the usual manner, reverses the direction of the car. By depressing the button marked "neutral" all the buttons are released, and by depressing the clutch pedal the gears are brought to neutral. It is absolutely impossible to have more than one push button depressed at the same time. By the interlocking arrangement any button that is depressed is released when another button is depressed. No clashing of gears is possible.

As far as the electric gear shift is concerned almost no current is consumed. So instantaneous is the gear shift operation performed that there is not an appreciable consumption of current.

The generator in the Norwalk car supplies sufficient current to the storage battery to keep it always evenly and fully charged. This storage battery in turn supplies current for the lighting, starting, and gear shift operations.



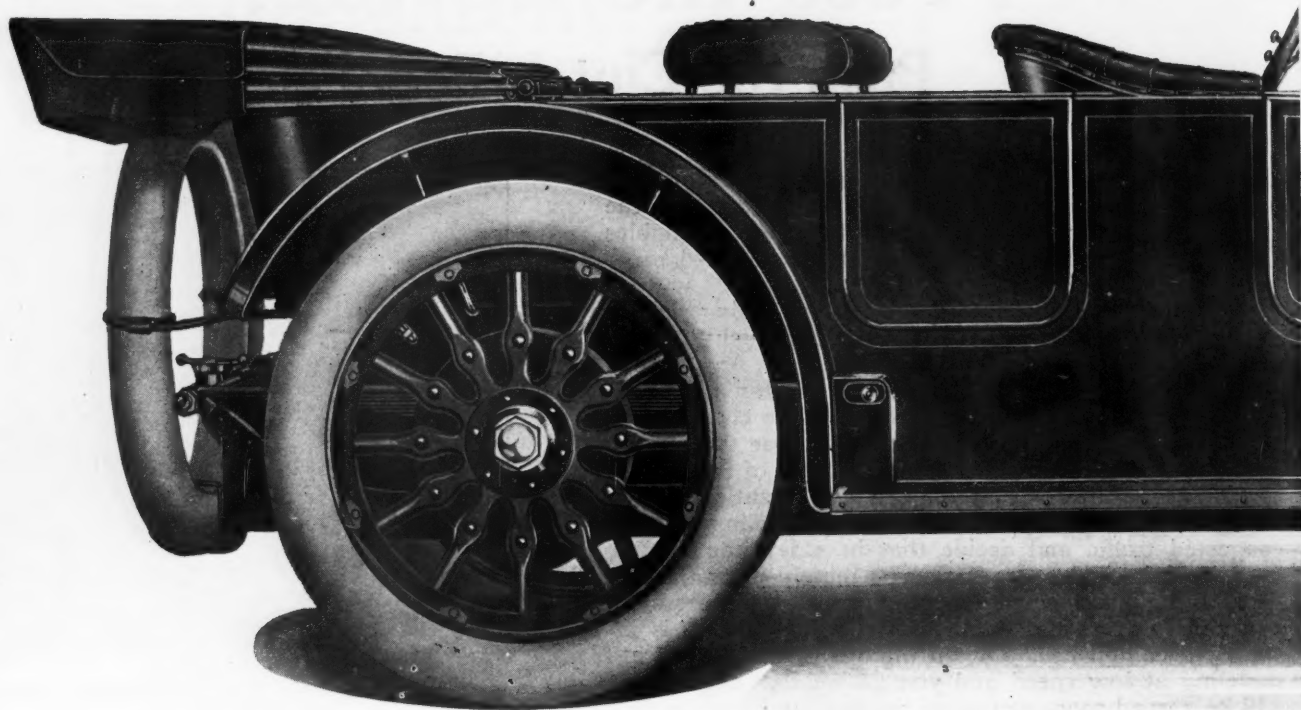
View showing the Vulcan Gear Shift attached to the Gear Box



View showing the lid removed

Norwalk Motor Car Co.

Martinsburg, W. Va.



The Highest Development of the Motor Car Has Been Reached In the Norwalk Underslung Six

THE instant incorporation of the newest and best ideas in automobile construction is but an indication of the leadership of the NORWALK.

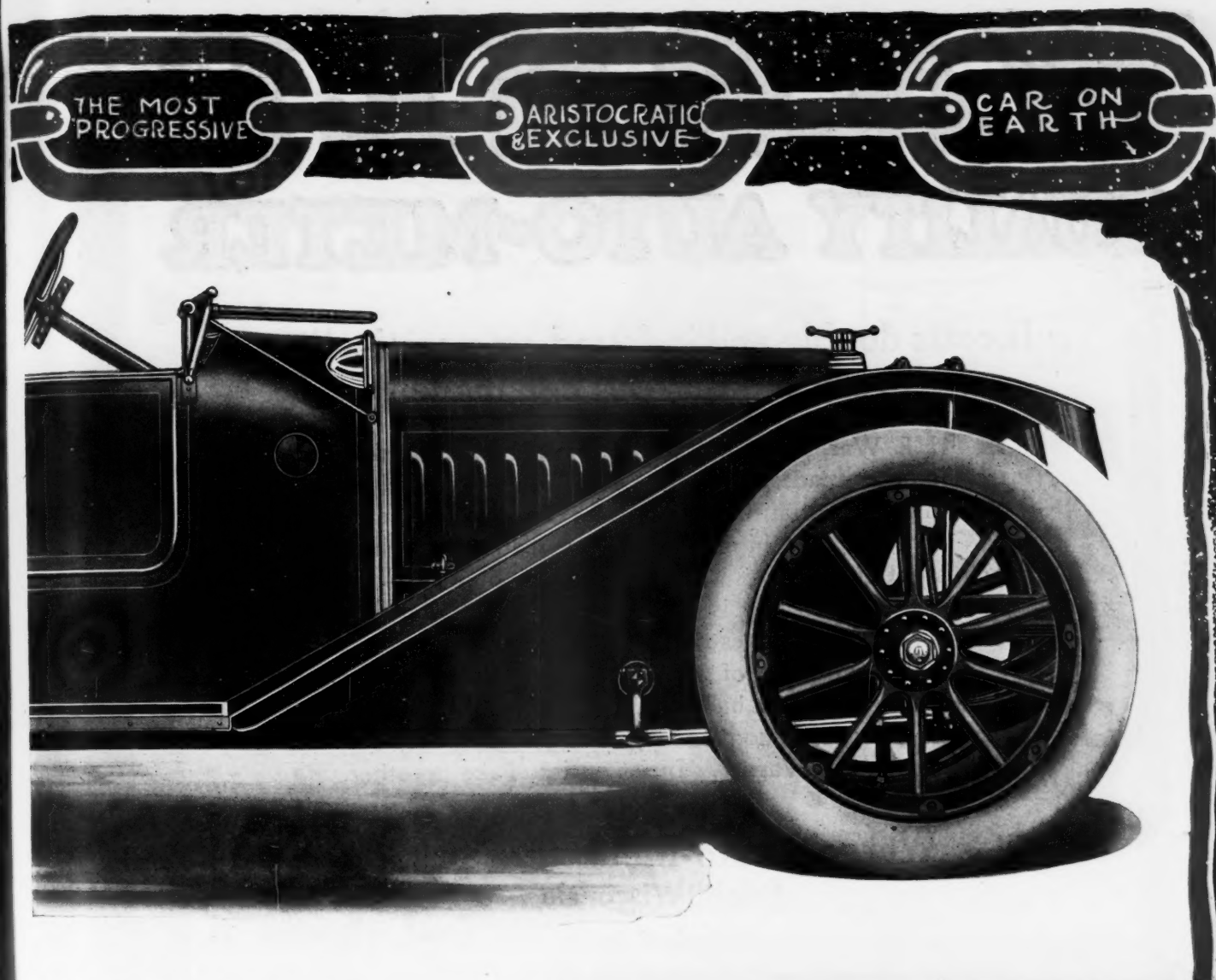
We were the first manufacturers that ever built an Underslung, Six Cylinder car. Into that Six Cylinder car we not only incorporated the principle of six cylinder continuous power and Underslung construction, but at the same time worked out a principle of spring suspension that was entirely different—and by all odds more efficient—than that found on any other car.

Other Underslung cars on the market suspend their springs below the axle. They have a true sweep spring. The NORWALK springs, however, are flat all around, supported on top of the axle. The cause of side swing or body swing in any car, either Overslung or Underslung, is a result of a differentiation between the point of suspension, the point of support and the center of weight. In the NORWALK SIX these three are coincident. In rounding corners the centrifugal force is not taken up by the springs vertically, but is taken laterally by reason of the above mentioned points being coincident. As a result, the NORWALK when rounding curves carries as much

weight on all four wheels as it does in a straight-away until you have absolutely overcome the center of gravity.

Everything that is conducive to touring satisfaction is yours in the NORWALK UNDERSLUNG SIX. *Does Appearance count with you?* The NORWALK SIX has classy lines and a subtle distinctiveness that sets it apart from other cars. *Do you wish comfort?* The long flat springs—the big wheels—the over-sized tires—the long wheel-base—and the luxurious, restful upholstery make riding in the NORWALK a veritable delight. *Do you need power?* In the NORWALK there is a smooth, silent motor; ninety-three percent of the power that is developed is transmitted to the wheels; every line and curve of the car bespeaks power. *Does economy count?* The NORWALK UNDERSLUNG SIX is more economical to keep than many a car of half its size and power.

There is not a feature about the NORWALK UNDERSLUNG SIX but what gives true comfort and thorough efficiency.



Quick Action Is Necessary Mr. Dealer!

THE NORWALK is the only Underslung six cylinder car with an electric gear shift on the market today.

It is the most distinctive car produced anywhere in the world—and makes a peculiar and effective appeal to the discriminating motor car public.

But our output is limited. You'll have to act quick! Fill out this coupon at once. Write us for details!

Two models \$2650—\$3500.

MAIL THIS NOW

**NORWALK MOTOR CAR COMPANY,
Martinsburg, W. Virginia.**

Gentlemen:—Send me your literature descriptive of the latest Norwalk Underslung Six-cylinder models with Electric Gear Shift.

Send me your dealer's proposition in my territory for the Norwalk Underslung Six.

Name

Address

City State

WARNER

QUALITY AUTO-METER

It costs double and is found on practically every high priced car made

THE Warner Auto-Meter is the highest priced speedometer made. Its association with practically every high priced automobile on the market is a clear indication of how highly automobile manufacturers regard and respect it.

If the car you buy is equipped with a Warner you can feel secure in your investment.

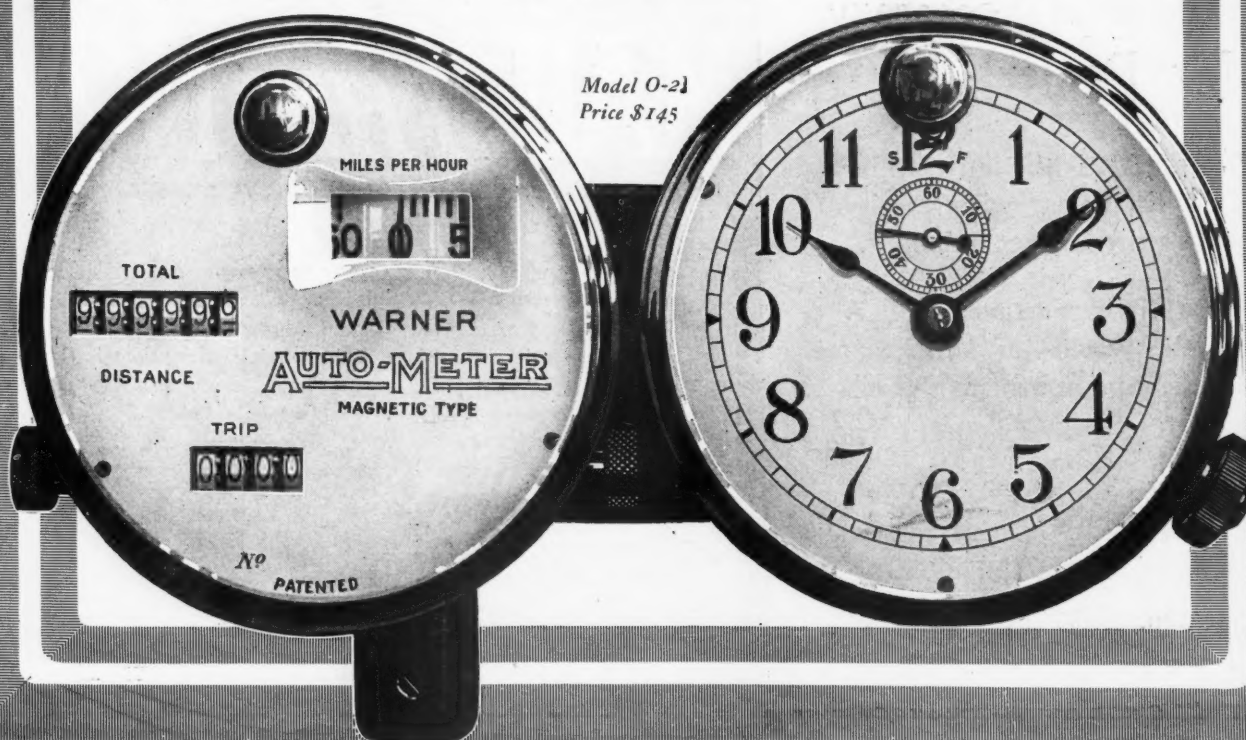
But the absence of the Warner on any high-priced automobile is usually a bad sign. It means the manufacturer is endeavoring to economize at your expense.

Look for the Warner. Insist on it. Take no other.

**The Warner Auto-Meter Factory, Dept. 1
Beloit, Wisconsin**

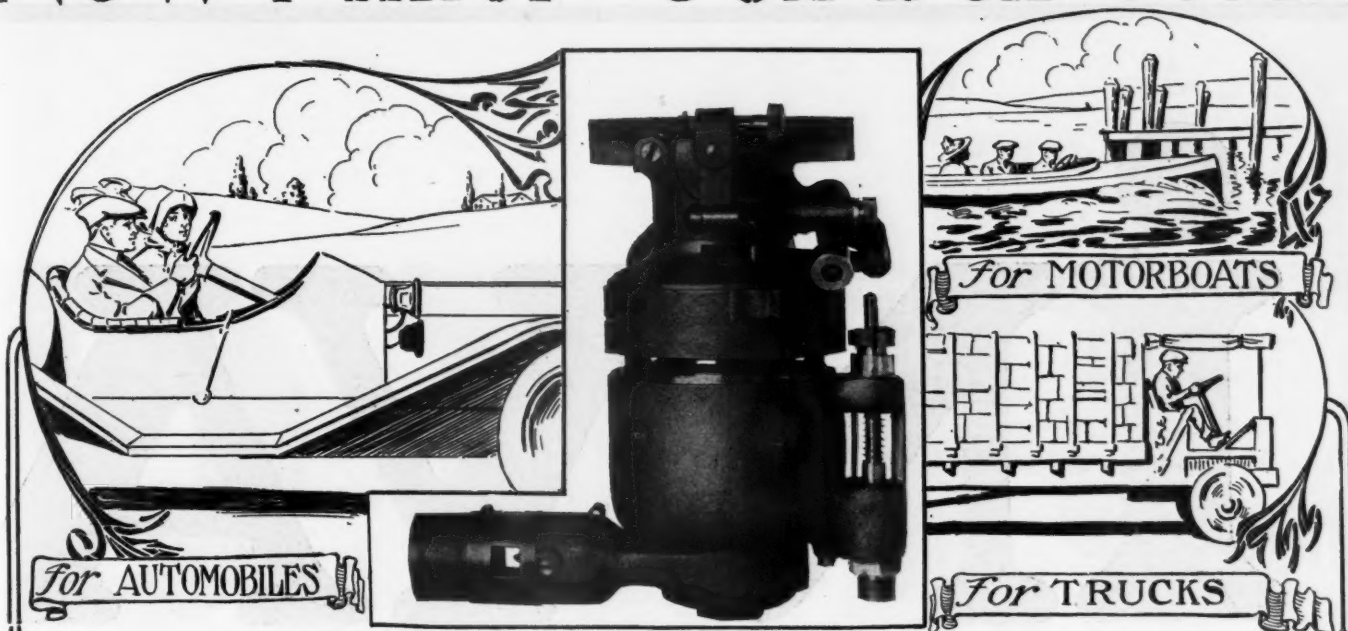
International Service

Service Stations in all principal cities all over the world



When Writing to Advertisers, Please Mention Motor Age.

New-Miller Carburetor



A New-Miller Carburetor On Your Car Means More Power, More Mileage, More Flexibility

It will solve your carburetion problems, and relieve you of engine troubles

Here Is What It Actually Does

- (1) Takes care of any grade fuel from gasoline to distillate.
- (2) Adjusts from seat for all weather conditions.
- (3) Throttles down without knocking.
- (4) Gives maximum power on low, intermediate and high.
- (5) Mechanically adjusted by throttle opening or closing.

That's why leading manufacturers of automobiles, trucks, and motor boats are adopting New-Miller Carburetors.

The New-Miller Proposition

Once the New-Miller carburetor is set on your motor, no further adjustments are needed. All subsequent changes made necessary by difference in altitude, winter or summer weather, good or bad gasoline, can be made from the seat.

The slightest movement of the throttle gives a positive movement to the auxiliary air and gas needle. This means real carburetor service.

New-Miller carburetors are manufactured by specially designed machinery, machined to one-thousandth inch, subjected to a rigid inspection, and tested on all types of motors. Every unit in a million of them would be interchangeable.

Saves Its Cost In One Season

A season's use will easily save you fuel and repair expense to pay for a New-Miller and freedom from carburetor troubles on your car.

We stand ready to prove this.

You can prove it for yourself if you will take the time to send for the New-Miller Booklet.

Go over it carefully. The facts are self-evident.

New-Miller Carburetor Co.
514 N. Capitol Ave., Indianapolis, Ind.

FACTORY DISTRIBUTORS:

E. J. EDMONDS CO.....1783 Broadway, New York
 SMITH BROS., ELLIS.....311 W. Pico, Los Angeles, Cal.
 DAHL PUNCTURELESS TIRE CO..1309 Race St., Philadelphia, Pa.

A Big Opportunity for Good Dealers.

Write Us Today.

USE THIS COUPON TODAY!

NEW-MILLER CARBURETOR CO.,
 514 N. Capitol Ave., Indianapolis, Ind.

Gentlemen:

Send me full particulars on the New-Miller.

My car is

Manifold isinches.....

Name

Address

iNVA OI



Owing to the high price of Pennsylvania Crude, the market is now flooded with low grade, low gravity lubricating oils, totally unfit for automobile lubrication. Lubricating oil, like gasoline — deposits less carbon when it has a light gravity.

I. O. C. GEAR OIL is the only oil ever made mobile transmission gears. "It puts noisy gears to

INVADER

Lessees of Chas

MAIN OFFICE

79 Broad Street.....New York

FACTORIES

New York and Philadelphia

BRANCHES

BOSTON.....284 Columbus Ave.

WASHINGTON.....3627 New Hampshire Ave. N. W.

PHILADELPHIA.....113 Arch St. & 719 N. Broad St.

DEER LS



especially and exclusively for the lubrication of auto-sleep." Write for prices and descriptive booklet.

OIL CO.

F. Kellom & Co.

TERRITORIAL AGENTS

Boyer-Campbell Co.....Detroit, Mich.
Beck & Corbitt Iron Co.....St. Louis, Mo.
Motor Car Supply Co.....Chicago, Ill.
Lee Hardware Co.....Salina, Kans.
Electric Manufacturing Co.....St. Paul, Minn.
American Lubricating & Supply Co.....Kansas City, Mo.
James Bailey Company.....Portland, Me.

A SIMPLE TEST

Try this test with Invader Oil and any other oil. You will see the other oil gradually sink down in the Invader Oil—proving that Invader Oil has a lighter gravity and is therefore freer from carbon and better for use in automobiles.

The Atwater Kent Ignition System



You used to drive your car as a "stunt"

Today you drive it for pleasure or business and the less you have to think about "stunts" the better you like the car.

There was a time when changing gears was a stunt. Keeping the sight feed oiler at its work, and the coil tremblers tuned up, and the gas generator in condition to generate were other feats of that Stone Age of motoring.

But if you had to go through all those *coups de legerdemain* today you would sell your car and use the trolley.

But there's one bit of juggling that you still practice—and it takes some skill, too! That is the manipulation of the spark lever.

There's a difference between managing the spark and managing the throttle. The latter is voluntary; you open the throttle to go faster and close it to go slower. But the former is forced upon you by the peculiarities of the engine. You advance or retard the spark because you must, not because you like to. And many drivers never really get the knack—they advance or retard at the wrong time, and fuel is wasted and bearings strained in consequence.

Hand control of the spark, for ordinary ranges of speed, is really as much a relic of the past as constant regulation of the mixture would be. Just imagine yourself juggling with the carburetor in the way you do with the spark advance! Automatic control is as sure to come in the one case as in the other, and it is *already here*, for some thousands of motorists who have read the signs of the times and provided themselves with the truly modern kind of ignition service.

We should like to tell you all about the new Atwater Kent System—Type K—not merely because we want to sell it, though naturally that is a factor, but because we know that automatic spark control is the coming thing, and that the Atwater Kent embodiment of that principle gives the ultimate in reliability, efficiency, and convenience. There's not a motorist who installs it but wonders how he ever endured the annoyance so long. And the marvel of it all is the simplicity and low cost of the device!

In another year or two, automatic control will be universally demanded. You will want to be in the forefront. Write your name and address on the margin of this page and we will send you our Booklet "A" and full particulars of the Atwater Kent System without obligation on your part.

ATWATER KENT MFG. WORKS

4934 Stenton Ave., Philadelphia, Pa.

DISTRIBUTORS

New York, E. J. Edmond Co.; Chicago, Motor Car Supply Co., Pellets Magneto Exchange; San Francisco, Chanslor & Lyon Co., Weinstock-Nichols Co.; Los Angeles, E. A. Featherstone; Seattle, Chanslor & Lyon Co.; Portland, Ballou & Wright; Omaha, Omaha Rubber Co., Powell Auto Supply Co.; Dallas and Houston, Fisk Co. of Texas; Wichita, Hockaday Auto Supply Co.; St. Louis, Missouri Auto Specialty Co.; Salina, Lee Hardware Co.; Kansas City, Kansas City Auto Supply Co.; Milwaukee, Julius Andrae & Sons Co.; Detroit, Automobile Equipment Co.; Boston, Motor Supply Shop; Denver, Auto Equipment Co.; Hartford, Post & Lester Co.; Atlanta, Elyea-Austell Co.; Chattanooga, Southern Auto & Supply Co.

When Writing to Advertisers, Please Mention Motor Age.



Arbeco Lamps

The Last Word in Lamps for Automobiles and Motor Boats

Here at last is a botherless lamp for the motorist—a lamp that throws a wonderfully strong, steady, clear light; a lamp which may be cleaned inside and out in half a minute by simply using a damp cloth; a lamp which may be finished to match the body of the car, or in gold, brass, nickel, copper, or any color; a lamp which requires no burnishing to renew its beauty.

Remarkable Exclusive Features of This Patented Arbeco Lamp

Both reflector and body are made of the highest grade of glass. The lamp is made by skilled workmen in such a manner that its durability is guaranteed. No metal comes in contact with the glass at any point. The outside finish of the lamp—gold, brass, copper, nickel, or any color—is put on **under** the outside glass. The reflecting coat is applied **outside** the reflecting glass—thus one or two rubs with a damp cloth clean both outside and inside, and it is simply impossible for the lamp to be scratched, clouded or tarnished in any way.

The ARBECO Lamp is always bright and will retain its original lustrous finish and reflecting and projecting power forever.

The ARBECO Lamp is absolutely impervious to heat, moisture and dirt.

The ARBECO Lamp cannot become hot from the sun's rays nor from the electric light within because of the **vacuum** between inner and outer body.

The ARBECO Lamp is from one to three pounds **lighter in weight** than any metal lamp.

The reflecting surface is designed on the principle of the true parabolic curve, projecting the most powerful ray of light possible from a point focus.

Fittings: True parabolic **silver mirror** reflector fitted flush to glass in door. Focal adjustment. Wired socket for bulb. Door and trimmings finished in high grade brass or nickel.

Automobile Manufacturers and Dealers in Auto Supplies:

Investigate the ARBECO Lamp—the most remarkable advance in motor lighting. Notice its attractive design, paraboloid shape and classy appearance. The severest tests over rough roads have not damaged it in the least. We manufacture in sizes to meet headlight and sidelight requirements of all sizes of touring cars, roadsters and runabouts.

Write us today for all particulars desired

The Reynolds-Browne Company
1726 First National Bank Building, CHICAGO, ILL.

PLATINUM COSTS \$720 A POUND

Nevertheless we use *genuine* platinum iridium points of *large* proportions for contacts in every KINGSTON Magneto.

We have to send to Germany to get just the right quality Tungsten Steel for our magnets. The ball-bearings we use could not be selected with more painstaking care if they were intended as jewels for a watch. Down to the last tiny set screw, KINGSTON Magnetos are constructed from the best materials home and foreign markets afford.

If you believe that QUALITY is good pocket-book insurance,—specify KINGSTON next time.

KINGSTON IGNITION SPECIALTIES

also include spark-plugs, make-and-break coils, dash coils, box coils, motorcycle coils, switches and other ignition devices—all quality plus in construction.

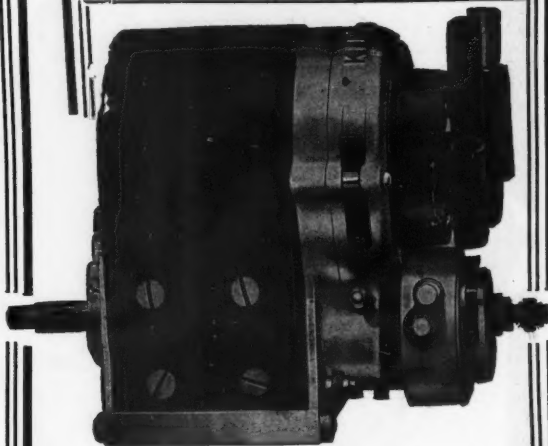
Write for Catalog

KOKOMO ELECTRIC COMPANY
Kokomo :: :: Indiana

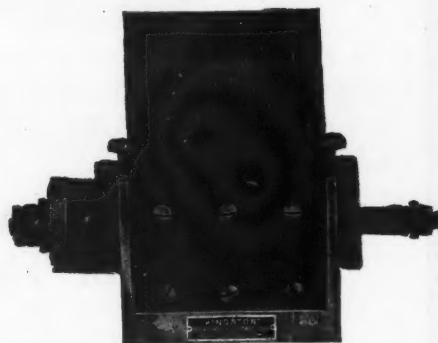
BRANCHES:

Chicago . . 1430 Michigan Ave.
Detroit . . 650 Woodward Ave.

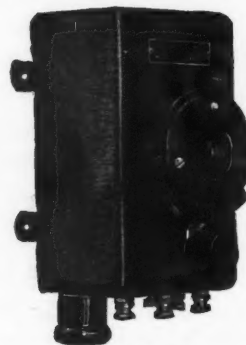
New York . . 1733 Broadway
Los Angeles . . 332 W. Pico St.



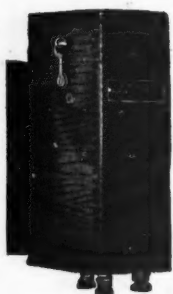
Model "B" Magneto



Model "E" Magneto



Dash Board
Transformer



Covered Vibrator
Box Coil



A. L. A. M.
Standard Plug



Kingston Switch

When Writing to Advertisers, Please Mention Motor Age.

National

Announcement of another series of National Cars— **SERIES V-3**

ONLY one car is better than a *National* and that is a *better National*. The best thing we can say of this New Series V-3 is that these cars are the best the National company has ever built. Improved Series V succeeded the Series V, and now comes the perfected Series V-3. Every new series of *National* cars inherits the "championship quality," and the accumulated result of years and years of development and success has produced the greatest "breed" of cars on earth.

They represent the ideal in motor cars, for comfort, power, efficiency, ease of operation, capability in every emergency, noiselessness and convenience.

They are the natural result of more than thirteen years of constant, all-the-year-round manufacturing experience. We do not make changes for the mere sake of changing; we do not "upset" everything by forcing yearly models.

The only standard we try to surpass—the only standard for us to surpass—is the *National's* former standard.

The *National* leads the world in demonstration of actual value. The *National* made and still holds the world's record for the fastest 500 miles in the International Sweepstakes races. There are so many such demonstrations of *National* superiority that the *National's* leadership has long been taken as a matter of course.

This New Series V-3 is guaranteed by the National company. No better reputation could possibly be given any car.

Beautiful cars in appearance, embodying the most artistic lines and the most luxurious finish—and mechanically so perfect that riding in one gives you that unconscious confidence and worryless ease which is the acme of touring or travel. They have everything the most exacting owner could desire. Let us send you complete information on this New Series V-3.

Once a National Owner Always a National Owner
Five Models—\$2750 to \$3400. Immediate Delivery

National Motor Vehicle Company
Indianapolis, Indiana

Another new and decidedly progressive development in motor car construction will distinguish the 1914



There have been three important epochs in the development of the motor car. They were the three important epochs in the development of the Cadillac. The history of the Cadillac is the history of motor car progression.

The First Epoch:—

Eleven years ago the Cadillac Company produced the first practical and durable motor car in large numbers.

How practical it was; how durable it was, the whole world knows, since those eleven year old Cadillacs are still in commission.

The Second Epoch:—

Five years ago the Cadillac Company, by massed production, scientific standardization and advanced manufacturing methods, was the first to demonstrate that it was possible to produce a high grade, powerful motor car to sell for less than \$2000.

The magnificent results of that demonstration are known wherever motor cars are driven:—the record of the cars as clean, as honorable today as the day they were built.

The Third Epoch:—

Two years ago the Cadillac Company first made possible a realization of the motorist's dream of an automatic electrical cranking and lighting system which banished to oblivion forever the awkward crank and the inefficient illumination.

Thus, three times have Cadillac policies and Cadillac principles left an indelible imprint upon the motor car industry.

Three times has the Cadillac Company accomplished that which was proclaimed impossible.

Three times has Cadillac progression set a pattern for almost universal adoption.

The Fourth Epoch

And now a fourth epoch, a fourth period of progression as important as those preceding it is soon to be inaugurated.

The Cadillac is about to endow the motor car with:—

A new element of efficiency

A new quality of luxury

A new source of economy

The Cadillac Company is not, as you know, given to false premises or to false promises.

This new development, like its predecessors, is destined to influence the trend of the entire industry.

Public endorsement of Cadillac development has always been more emphatic than our own claims or assertions concerning that development.

It will be so in this instance. Your recognition of these new advantages will be immediate.

Our next announcement will contain particulars.

Any expectations which this may arouse in your mind will, we feel sure, fall short of your enthusiasm when you know the facts.

CADILLAC MOTOR CAR CO.

DETROIT, MICH.

When Writing to Advertisers, Please Mention Motor Age.

**THE SHOCK ABSORBER
THAT HAS SUPERSEDED
ALL OTHERS IN EUROPE**

The **A. V.**

(A. Vermersch & Cie.)

Hydraulic-Spring Shock Absorber

INCLUDING THE BEST FEATURES OF
ALL ABSORBERS WITH CERTAIN
IMPORTANT ORIGINAL
FEATURES.

\$35 per pair and up

Made for both front and rear

The A. V. Shock ABSORBER
is only 6" high and made in diam-
eters to suit the weight of the car.

They take the place of your
spring shackle without any spe-
cial attachments.

An opportunity to handle the
A. V. SHOCK ABSORBER is
now open to dealers and jobbers
throughout the country.

A complete line of sizes spe-
cially constructed for commercial
vehicles.

HUDSON EXPORT & IMPORT CO.

140 West 42nd Street

New York City

RHINELAND MACHINE WORKS

1254 Michigan Avenue,
Chicago, Illinois

650 Woodward Ave.,
Detroit, Michigan

JOHN D. WILSON CO.

1424 Vine Street,
Philadelphia, Pa.

220 Pleasant Street,
Boston, Massachusetts

**Actual Size of A. V. Shock Absorber and
Shackle**

When Writing to Advertisers, Please Mention Motor Age.

We Are Careful of the Small Advertiser

The big ones take care of themselves. A magazine's success is first noised abroad by the small advertiser whose results are consistently good. The big fellows follow.

We claim that the average of The Literary Digest as tested in many lines of advertising is as high as that of any magazine published today and we are as much interested in making the 56 line shock absorber advertisement pay as we are in bringing results to the automobile double spread.

Total Number of Display Advertisements January—May, 1913

S. E. Post		Literary Digest		Cosmopolitan		Collier's	
January	454	January	379	January	282	January	295
February	464	February	468	February	380	February	308
March	664	March	612	March	358	March	390
April	624	April	492	April	423	April	326
May	593	May	528	May	412	May	374
1913 Total	2,799	1913 Total	2,479	1913 Total	1,856	1913 Total	1,693
1912 "	3,382	1912 "	2,276	1912 "	1,749	1912 "	1,929
		Gain		203			

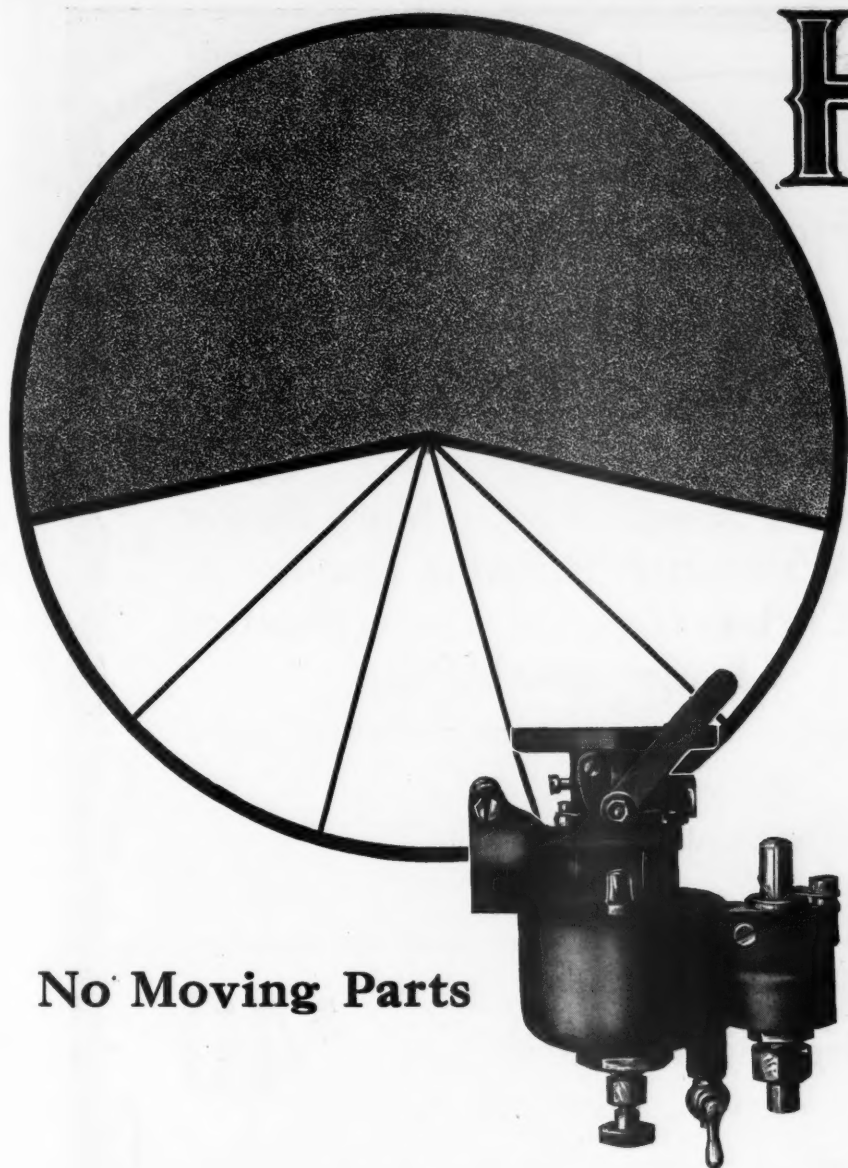
We seek automobile advertising as a class publication with a mass interest. It is the combination that makes us a great advertising medium. Natural circulation at a \$3.00 subscription price and the number, 280,000, gives us a value that cannot be duplicated.

The Literary Digest

45%	Digest circulation in cities	100,000 and over
5%	" " " "	50,000 to 100,000
6%	" " " "	25,000 " 50,000
8%	" " " "	10,000 " 25,000
7%	" " " "	5,000 " 10,000

HOLLEY

CARBURETOR



No Moving Parts

Only One Adjustment

Assuming That the Area of the Disc here shown represents the entire number of carburetors used on gasoline motor cars in the United States, the shaded portion represents the relative portion of those supplied by Holley Brothers Company with the new self-adjusting, no-moving-parts Holley Carburetor.

This output amounts to over 215,000, which is more than the combined output of gasoline automobile carburetors made by all the other companies.

HOLLEY BROTHERS CO., 131-141 Rowena St., Detroit

AUTOMOBILE SUPPLY COMPANY...1335 Michigan Boulevard, Chicago, Ill. OMAHA RUBBER COMPANY.....Omaha, Neb.
FOREIGN BRANCH: Holley Bros. Co., Coventry, England

Holley Carburetors are carried in stock at the following addresses: CHAS E. MILLER, Home Office: 97-103 Reade St. and 121 Chambers St., New York.

BRANCHES:

New York City.....924 Eighth Ave. Between 54th and 55th Sts.	Hartford, Conn.....274 Trumbull St.	Detroit, Mich.....227-229 Jefferson Ave.
New York City.....2782 Broadway Between 107th and 108th Sts.	Atlanta, Ga.....66 Edgewood Ave.	Cleveland, Ohio.....1829 Euclid Ave.
Springfield, Mass.....Bridge and Dwight Sts.	Brooklyn, N. Y.....1421 Bedford Ave.	Philadelphia, Pa.....318 North Broad St.
	Buffalo, N. Y.....824 Main St.	New Orleans, La.....601-603 Baronne St.
	Albany, N. Y.....135 Central Ave.	Newark, N. J.....274 Halsey St.
	Boston, Mass.....202-204 Columbus Ave.	

When Writing to Advertisers, Please Mention Motor Age.



Price, \$15.00

Over 46,000 Ford Owners Have That

SATISFIED FEELING

Because They Use The



Master Vibrator

which gives

A Hotter Spark More Power
A Smoother Running Engine
Less Carbon Deposits Easier Starting
Cleaner Spark Plugs



An honest article at a fair price—large, powerful condenser, genuine solid platinum-iridium points of generous size, strongly built kick switch—

The Standard By Which All Others Are Judged

OUR GUARANTEE—Try the K-W Master Vibrator for 30 days and if you can get along without it, return it and we will give you your money back and ask no questions.

SEND FOR DESCRIPTIVE FOLDER.

Improve the efficiency and appearance of your car by installing a

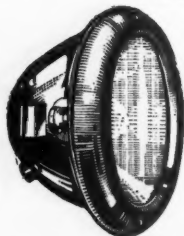


Electric Headlight Outfit

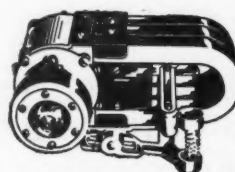
\$40

Complete Outfit, Electric Generator, Headlamps, Switch, Wire and Bulbs.

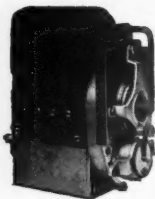
Ford Outfit For Fly-Wheel Magneto, \$15.00



The K-W Generator can be easily installed on any car having exposed fly-wheel or other convenient place to belt or friction drive the Generator. This is the most simple, efficient and economical electric headlight outfit on the market. If you have lamps we can furnish you with the generator for \$25.00. Send for illustrated folder.



The K-W High Tension Magneto



The strongest made for the largest engine made. Positive results and entire satisfaction guaranteed. Give description of engine and ask for price. You can't make an engine too big for the K-W. No batteries needed to start.

WE PREPAY THE EXPRESS all the way on the K-W Master Vibrator and East of the Mississippi River on all our other goods when cash accompanies the order.



Give the
Street Number →

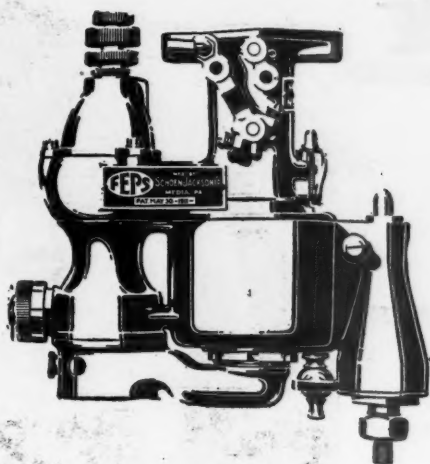
**2835, CHESTER
AVE.**

CLEVELAND, OHIO, U.S.A.

Agents in principal cities.

NEW YORK, E. J. Edmond, 1783 Broadway.

BOSTON, W. J. Forbes, 243 Columbus Ave.



FEPS

"A Giant in Power--A Miser in Fuel"

FEPS Distributors and Service Stations

New York, Factory Branch, 1777 Broadway
 Philadelphia: Fischer Auto Supply Co., 1415 Filbert St.
 Boston: Motor Supply Shop, 883 Boylston St.
 Pittsburgh: Automobile Supplies Co., 200 Wood St.
 Cleveland: E. A. Hammer Co., 1839 Euclid Ave.
 Baltimore: Carl Spoer's Sons, 901 S. Carey St.
 Rochester: Auto Repair Co., 55 East Ave.
 Wilmington, Del.: Ayers' Garage, 11th and West Sts.
 Wichita: Hockaday Auto Supply Co., Wichita, Kansas.
 Washington: Miller & Dudley Co.

YOU have no doubt noticed how trifling necessities like continuous shifting of gears, back firing of the carburetor, frequent replenishing of gasoline, etc., detract from the pleasure of motoring—but have you ever experienced the real comfort resultant from the elimination of these petty annoyances? It is safe to say that you have not, unless you have ridden in a "Feps equipped" car.

The motorist whose car is equipped with the Feps Carburetor really enjoys its use. The unusual power enables him to take any reasonable hill without shifting of gears. The wonderful flexibility and smoothness of the motor insure thorough riding comfort while the mileage increase of from 25 to 50 per cent. eliminates the necessity of frequent stops for fuel. These are but a few of the many features that have made the Feps Carburetor so universally popular in a few months.

If you would really enjoy your car, have it "Feps equipped."

**WRITE DEPT. "G" FOR ATTRACTIVE
DEALERS' PROPOSITION.**

Schoen-Jackson Company

Media, Pa.

"This Is Just Physical Torture"

It is physical torture because a hand pump makes the motorist work with it. A hand pump without 2 strong arms and a strong back behind it is nothing but a useless piece of tubing with a piston in it. The purchase of a hand pump is an agreement on the part of the motorist who buys it to blister his hands, to stream perspiration, to strain his back, waste his time, and spoil his motoring pleasure.



MAYO *SPARK* PLUG PUMP

THE MAYO SPARK PLUG PUMP, when it comes to inflating tires, lets the motorist out. It pumps tires for, not with him. It uses the motor's muscles—permits him to save his. He can sit on the running-board and watch the motor do the work, 5 times faster than he could with a back-racking hand pump. And his wife can pump tires as well as he.

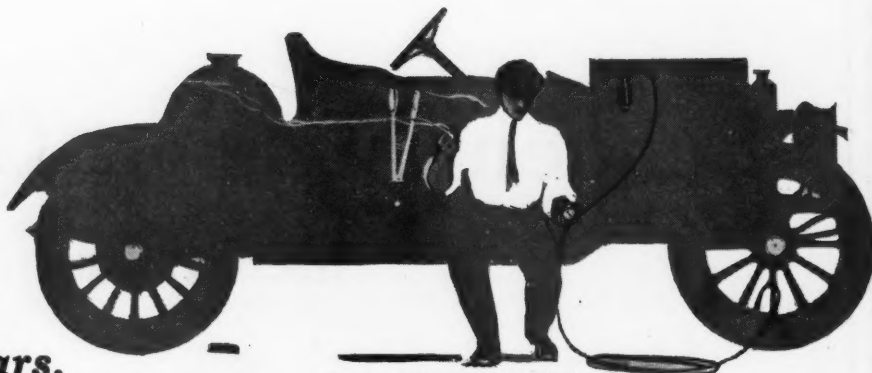
Some motorists still consider a hand pump an economy because of its low initial cost. Apply to the cost of a MAYO what you would ordinarily pay for a good hand pump. Use the MAYO and it will make up the difference by paying for itself in the physical discomfort it saves you.

The MAYO is instantly attached by substituting it for any spark plug. It pumps nothing but pure, fresh air. Inflates the largest tire in from 2 to 4 minutes. Built with metal rings like your motor and will last as long. Adaptable to all size cars from the smallest FORD to the largest LOZIER. An occasional drop of oil is the only attention it ever requires. Weight, 2½ pounds. Fits nicely into the tool box. Complete with 12 feet of hose and connections.

PRICE \$10. Pressure Gauge \$2 Extra

MAYO MANUFACTURING CO., 55 E. 18th St., Chicago, Ill.

**You
can use
this pump
FREE on your
car for 30 days
before purchasing.
Write for particulars.**



This Is Just Perfect Comfort



This Little Tool Will Save You Time and Energy & MAKE YOUR CAR A BETTER ONE

Knowlson's Spring Leaf Spreader

Of course you realize that lubricating the leaves of your springs is as necessary as lubricating the axles. But up to now it has been so troublesome and unhandy a thing to do—and you were afraid that with the cold chisel and hammer method of lubrication you might damage the springs—that you have probably neglected this.

You can now have a device which easily spreads the leaves of your springs, making it possible for you to lubricate them with the least expenditure of time and energy. KNOWLSON'S SPRING LEAF SPREADER does away entirely with jacking up a car. You merely adjust it to the spring, turn a handle, and with a jack knife or oil can spread the grease on the springs.

You know that the occasional lubrication of your springs will not only save you many dollars later on but will relieve you from the annoyances of squeaking springs. Then, too, well oiled springs make the car ride easier.

KNOWLSON'S SPRING LEAF SPREADER will be the biggest money saver and time saver in your tool kit. It is made of drop forging, nickel plated, highly polished and well finished. Weighs less than a pound and is readily adjustable to any spring.

"The best tool of its kind we have seen," says the Cadillac Company.

GUARANTEED TO BE ABSOLUTELY SATISFACTORY OR YOUR MONEY BACK. At all dealers or sent prepaid upon receipt of price.

Spring Leaf Lubricator Co.
ANN ARBOR, MICH.

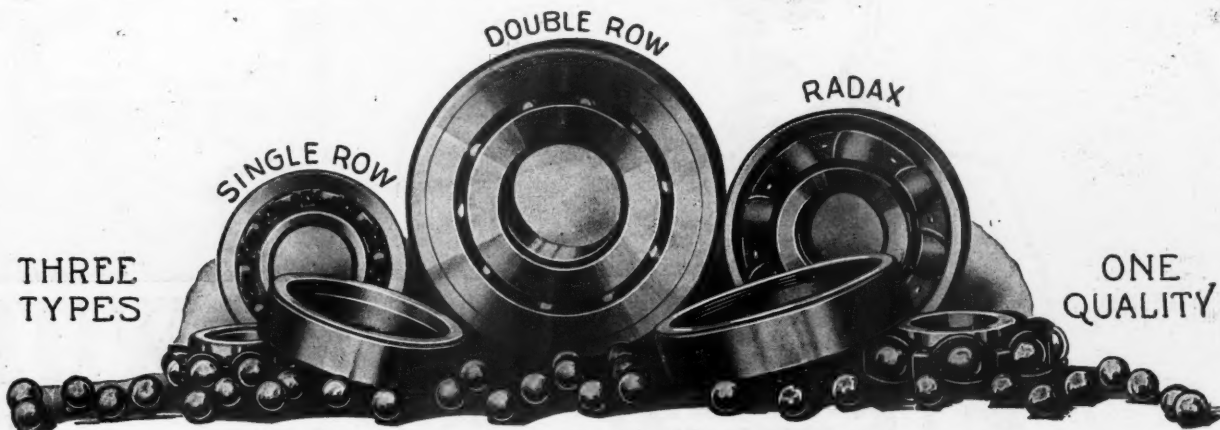
**Spring Leaf
Lubricator Co.**
Ann Arbor, Mich.

Gentlemen:
Enclosed find \$1.50 for one
Knowlson's Spring Leaf Spreader
to be sent prepaid. I can return
this if not entirely satisfactory.

\$1.50
Prepaid

use this coupon

AMERICAN MADE FOR AMERICAN TRADE



NEW DEPARTURE BALL BEARINGS OF DISTINCTION

The motor car manufacturer is constantly seeking to put into his car that which will quickly sell it.

The fact that eighty per cent of the American-made motor cars sold this year are equipped with New Departure ball bearings at once proves the superior quality, efficiency, and service of this bearing, and gives it distinction.

The ball type of bearing is conceded to be a more thorough eliminator of friction than any other type. This means that engine energy is conserved to the utmost, economizing fuel, repair, lubrication, and maintenance cost.

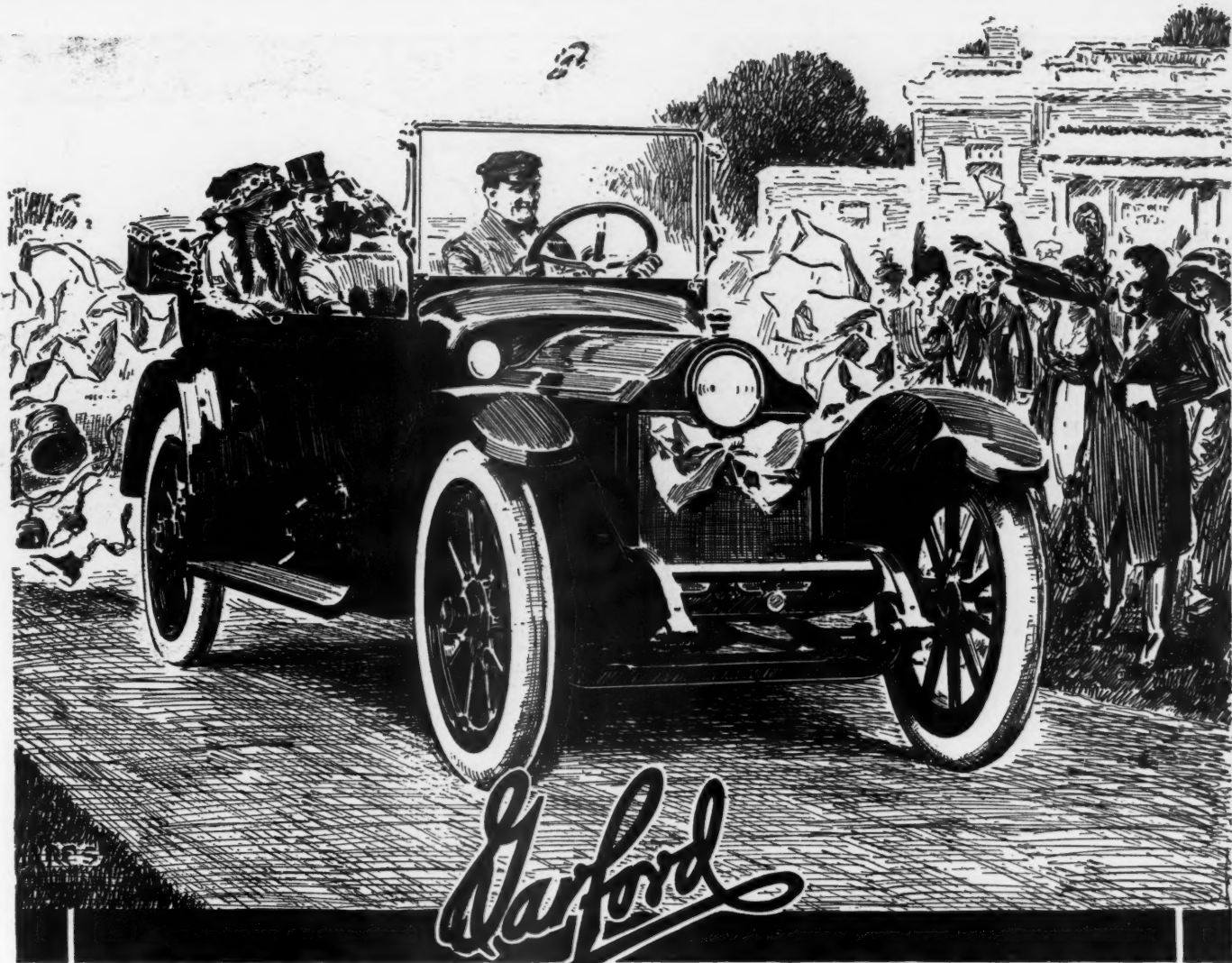
The car which was driven on Long Island, June 20, by S. G. Averell, the well-known automobile and efficiency engineer, for a distance of 86.6 miles on a gallon of gasoline, was mounted on ball bearings.

The purchaser of an automobile in which New Departure ball bearings are used knows that the designer and manufacturer have selected a bearing equipment that is the highest embodiment of correct principles of mechanics and skilled workmanship, worked out in materials guaranteed for strength and durability.

Send for instructive literature.

The New Departure Mfg. Co., Bristol, Conn.

Western Branch, 1016-17 Ford Building, Detroit



\$2750

Completely Equipped

AS far as we can trace, the new Garford is the most widely discussed and most highly appreciated Six in America. This is due, not alone to its many novel innovations and practical improvements, but to its price—which is just about one-half that usually asked for a car of this character, elegance, comfort, speed, design and mechanical simplicity and efficiency.

The brief specifications below give the facts and value in detail. Look up the Garford dealer in your town. See this new Six without further delay.

Catalogue on request.

SPECIFICATIONS

Electric Starter, which never fails to start instantly—winter or summer.
All lights are electric.
Big, single electric parabolic headlight, sunk flush with the radiator.

Electric horn.
One piece, all steel body, steel Pullman car construction—no joints, no rivets, no wood.
Warner Auto-Meter driven from the transmission.

60 horsepower, long-stroke motor—3¾ in. by 6 in.
Wheelbase, 128 inches.
Tires, 36x4½.
Demountable Rims.
Center Control.

Left Hand Drive.
Three Speed Transmission.
Full Floating Rear Axle.
Bosch Magneto.
Equipment—everything complete from tools to top.

Please address Dept. 14

The Garford Company, Elyria, Ohio



Red Head
TRADE MARK REGISTERED
SPARK PLUG WRENCHES

Educational Series—No. 7

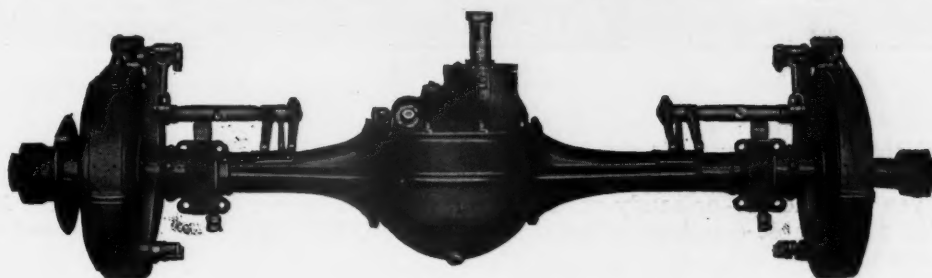
RED HEAD Spark Plug Wrenches save motorists thousands of dollars on broken porcelains.

They are furnished free with every set of (4) RED HEAD Plugs by every dealer throughout the country.

Red Head
— — — — —
Emil Grossman Company
New York — Detroit
Trenton, N. J. London, Eng.

When Writing to Advertisers, Please Mention Motor Age.

"American"



Axles of Quality

EXPERT JUDGMENT of a motor car discriminates sharply between external features which may be optional with any car, and those fundamental features that are built into it.

We don't think anyone will dispute the statement that of those features which are both vital and distinctive, it is the axle that really establishes a car's class.

The satisfactory operation of any car, whether measured in dollars or in security, is based upon axle efficiency. And this is as true of a gasoline car making its own power, as it is of an electric which leaves the garage with a measured amount of latent power in its batteries.

The axle problem is wholly one of power transmission, which depends upon the material used, excellence of design and durability of construction. Judged by any one of these factors, well posted automobile engineers will frankly concede the superiority of "*American*" Axles.

The adoption of "*American*" Axles is simply a quality proposition. The owner of a car equipped with them has the assurance that nothing equally good can be bought at any price.

"American" Axles offer the option of our own perfected bevel drive or the famous Lanchester-Daimler Worm Drive



THE AMERICAN BALL BEARING CO., Cleveland, Ohio

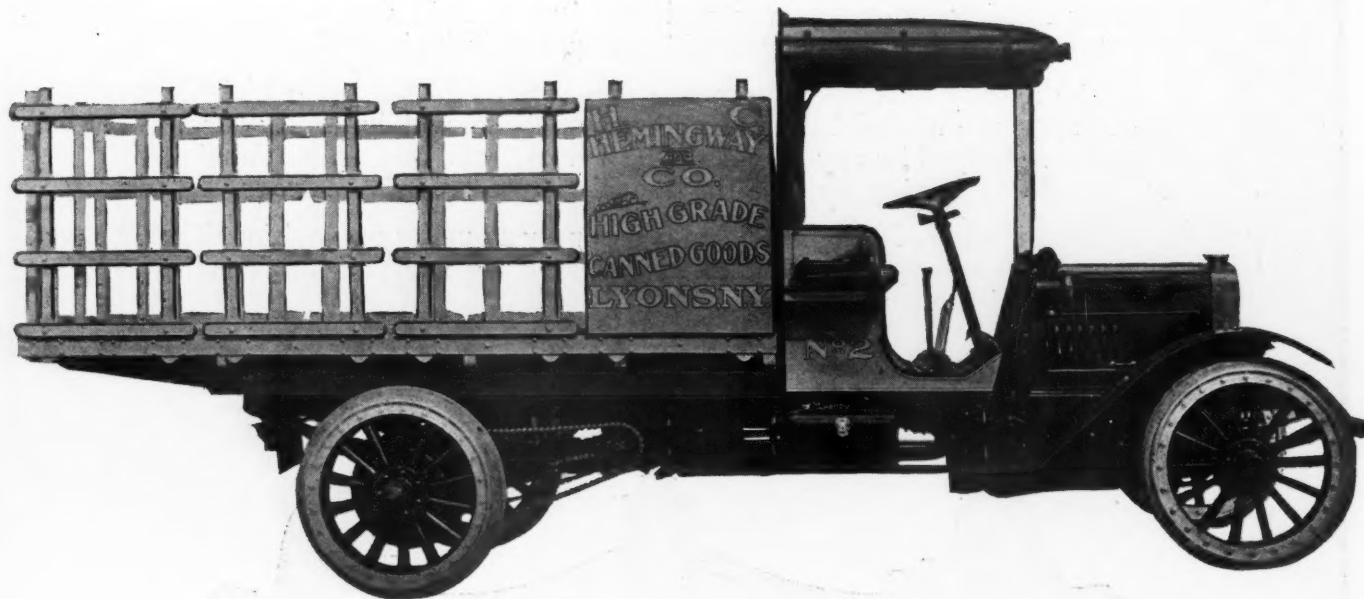
THE ATTERBURY LINE

MODERN business demands the best delivery service—the ATTERBURY meets that demand. Whether for long hauls where it is important to *get there and back* without delay—on uneven pavements—or sandy roads, or on streets where traffic is congested; in fact under almost every conceivable condition of service, ATTERBURY TRUCKS have proved their power, speed and economy.

In ATTERBURY TRUCKS, the traction power is efficiently delivered to the rear wheels.

Every truck is equipped with the distinctive ATTERBURY radius rods which have two horizontal and two vertical motions. These rods eliminate all undue strain. ATTERBURY TRUCKS have all the requisites of a modern, high class motor car. Ample power, an automatic governor, multiple disc clutch, indestructible radiator mounted on springs, selective transmission, nickel gears and double expanding brakes on rear wheels—all these guarantee the user maximum of truck efficiency.

Mr. Dealer: In the ATTERBURY line you have many *exclusive* and very desirable selling features. We have a very liberal agency proposition that we would like to tell you about. Write us today.



ATTERBURY MOTOR CAR COMPANY
BLACK ROCK, Dept. "M." BUFFALO, N. Y.

Materials, Workmanship and Deliveries As You Want Them

We have open capacity for 1914 and invite your investigation of our facilities to handle properly your contract for axles for the coming year.

Metal Products axles have an unsurpassed record for endurance, silence, good appearance and excellence of finish. They have been used on a number of well known cars and exclusively on two of the most popular cars for several years.

For your 1914 cars buy axles that will help sell them. The good reputation of Metal Products axles will help boost your sales and add to the popularity of your cars.

Metal Products axles are made in both standard types and to specifications. Order what you wish and get deliveries when you want them. We assure you the finest materials and workmanship and deliveries as desired for either gas or electric pleasure cars.

Write us before placing your contract.

Metal Products Company
Detroit, Michigan



What's in A Name?

WHEN we stamp the name MULTIBESTOS in bold, bright letters on our brake lining we do more than make a selfish bid for your business—we do more than offer you a means of identifying MULTIBESTOS from the other linings not so good.

We say to you: Here is a brake lining we are proud of; a brake lining we are glad to have you compare with any other under any conditions of service; a brake lining which we, as manufacturers, stand back of with a most liberal guarantee.

Do you think we could afford to do this if we didn't feel sure that MULTIBESTOS is the best brake lining made?

Standard Woven Fabric Company Worcester, Mass.

Sales Branches:

NEW YORK, 276 Canal Street

CHICAGO, 1430 Michigan Blvd.

PHILADELPHIA, 1427 Vine St.

BOSTON, 903 Boylston St.

SAN FRANCISCO, Fred Ward & Son, Inc.





INTERLOCKS

Double Your Tire Mileage

Prevent Punctures and Blow-Outs—Save Half Your Tire Expense

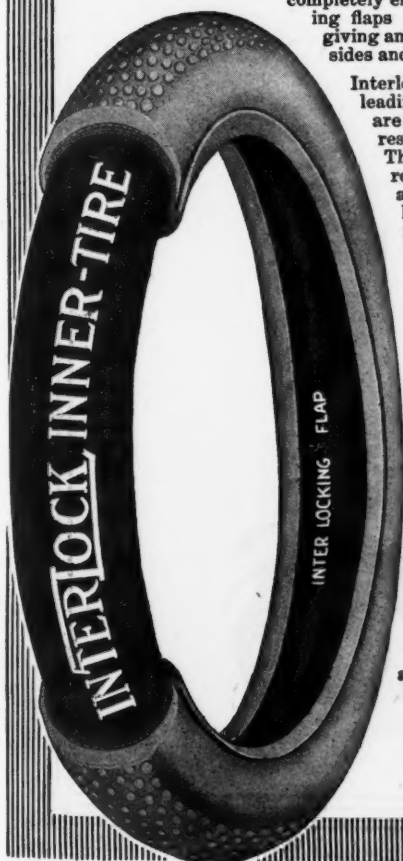
The Interlock Inner Tire is the only reinforcement that prevents rim cutting or that can be used to hold rim cut tires. Interlocks reinforce the sides of the tires as well as the tread, because they completely enclose the tube, and the interlocking flaps lock to the rim under pressure, giving ample excess fabric strength both to sides and tread.

tests have proved the efficiency of Interlock Inner Tires beyond question.

What Interlocks Are

Interlock Inner Tires are complete endless inner tires (not inner shoes) quickly and easily placed between the outer casing and the inner tube. They strengthen the outer case and protect the inner tube from punctures. The patented Interlock Flaps lock the Interlock securely, making it an integral part of the whole tire that flexes perfectly, and cannot chafe, creep or heat. Interlock Inner Tires will hold even if the outer case is broken, and can be used in old or new tires. They double the mileage of new tires and add 1,000 to 5,000 extra miles to old ones. Interlocks have a fine gray rubber finish, are smooth outside and inside and have no troublesome ends, joints or edges to cement. Interlocks do not affect the resilience of your tires—are easy to insert and can easily be removed from one tire and replaced in another.

Interlocks are sold and endorsed by the leading automobile supply houses. They are used with the most successful results by thousands of car owners. They have stood the hardest kind of road tests. Interlocks have made a 4,500 mile cross country run—the last 1,000 miles over 20 mountain ranges without a blow-out or even carrying an extra tire. In the Four States Tour, Interlocks stood the test of hard fast road work under the critical observation of tire experts, without tire trouble. These and other hard public



Write for Our Booklet Today

Read the testimonials of enthusiastic users. Let us give you complete information about Interlocks and the official records of hard road tests. Read what the world's largest tire manufacturers say about them. It will pay you to investigate.

To Dealers and Agents We want a live, reliable dealer in every city. You can do a big business by simply explaining Interlocks to car owners. Every car owner wants a set when he understands what they do. We give positive selling assistance and are advertising Interlocks widely.

Interlocks are Carried in All Sizes by:

Beckley-Ralston Co., Chicago; Motor & Machinists Co., Kansas City; Bi-Motor Equipment Co., Boston; Fry & McGill Co., Denver; Western Auto Specialty Co., Iowa City, Ia.; Gibson Automobile Co., Indianapolis; Southern Wesco Supply Co., Birmingham, Alabama, and all leading jobbers of automobile supplies. Please give the name of your supply jobber when you write.

DOUBLE FABRIC TIRE CO.
128 West 9th Street - Auburn, Ind.

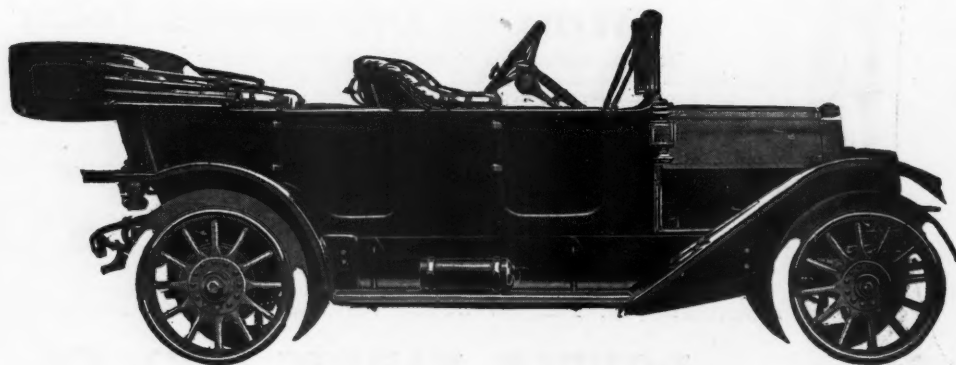
Overland

WHEN you buy an Overland you can bank on organized efficiency both in car and in service. Every element of chance is eliminated.

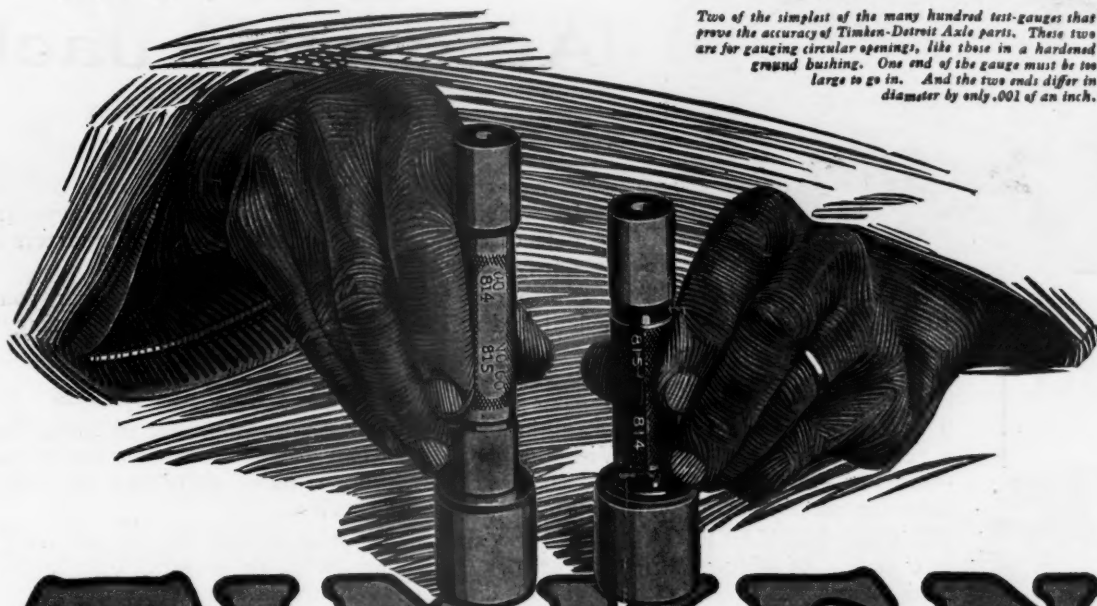
Catalogue on request. Please address Dept. 46

\$985 Completely Equipped
f. o. b. Toledo

The Willys-Overland Company
Toledo, Ohio



When Writing to Advertisers, Please Mention Motor Age.



Two of the simplest of the many hundred test-gauges that prove the accuracy of Timken-Detroit Axle parts. These two are for gauging circular openings, like those in a hardened ground bushing. One end of the gauge must be too large to go in. And the two ends differ in diameter by only .001 of an inch.

TIMKEN

AXLES & BEARINGS

WHEN you ride in your motor-car do you ever think how much of your comfort and safety you owe to the axles beneath you? Those axles are no mere solid bars of steel. Their hundreds of parts are combined into wonderful mechanisms that drive the car, change its direction, and allow the rear wheels to revolve at different speeds in turning corners.

And, day in and day out they carry the whole load, and take the incessant shocks and vibration of hard travel.

Every part in those axles has a duty to perform. Every part must be correctly designed for that duty. It is one thing to make these hundreds of pieces of metal right.

It is another—and just as essential—to prove them right after they are made.

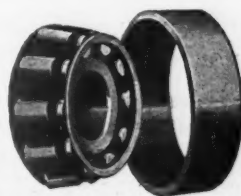
Both are equally important to your satisfaction—and to your safety.

In a Timken-Detroit Front Axle are 125 pieces, in a Rear Axle 723—The 858 are, we believe, the smallest number compatible with strength and safety.

In addition there are 248 separate pieces in the Timken Tapered Roller Bearings on the axle spindles, in the steering pivots, at the differential and on the pinion shaft.

Yet, counting each complete Timken Bearing as only one piece, there are 848 pieces in a set of Tim-

**4221 Operations
and not one
is left to
chance**



The one bearing whose tapered rollers enable it to meet greatest load plus end-thrust, and that is perfectly adjustable for the slight wear that will come to any moving parts, is the Timken Tapered Roller Bearing. No other has ever been used in Timken-Detroit Axles.

ken-Detroit Axles (front and rear) involving 4221 separate operations!

Every operation has its inspection, every inspection its gauge—some require several gauges.

Not one is left to chance, every one is proven.

And back of all are the Swedish Gauges—the highest standard of accuracy in the world.

Back farther still is the ideal of a great organization of men whose one goal is axle perfection in every smallest detail.

The study of axle and bearing importance is not a dry, technical subject. It is full of live, human-interest stories, and a revelation of the wonders of the modern motor-car. Write today for the Timken Primers, No. T-1 "On the Anatomy of Automobile Axles", No. T-2 "On the Care and Character of Bearings."

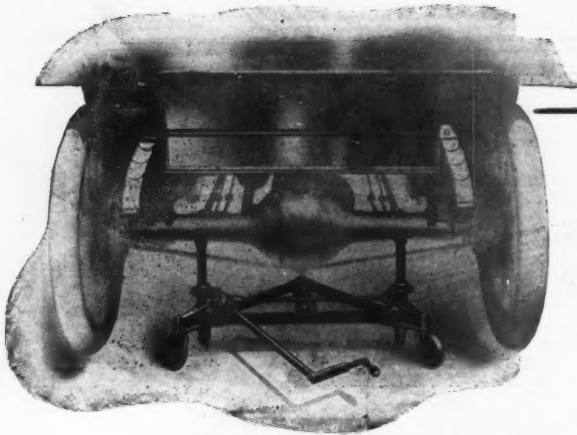
**The Timken-Detroit
Axle Company
Detroit, Mich.**

**The Timken Roller
Bearing Company
Canton, Ohio.**



(27)





One Man and WEAVER Auto-Twin Jacks

Can handle the heaviest
car with ease.

A pair of Weaver Auto Twin-Jacks is the only means by which ONE man can manipulate a heavy car with perfect ease and safety in the crowded quarters of the garage or show room.

With one Jack under each axle of the car you have the combined advantages of a ball and roller bearing turn table, transporting truck, —lifting jacks, and tire rests.

Will Save Their Cost in a Few Weeks

The saving in floor space, time and labor will pay for an equipment of these Jacks in a remarkably short time. With them one man can do the work of three in moving, —storing,—or unloading cars. In the repair shop or paint shop they are indispensable for manipulating cars while undergoing repairs.

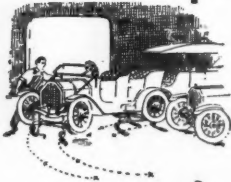
IN THE PRIVATE GARAGE they enable one man to care for the car with absolute ease. Washing, adjusting breaks, repairing tires, or general overhauling are made easy. As tire rests they are the most convenient on the market.

BALL AND ROLLER BEARING

The lifting mechanism and casters are ball and roller bearing throughout. Lifting leverage 400 to 1; wheel base 34 inches; lifting capacity 4000 lbs. each; weight 47 lbs. each.

Two for \$20 (One for
each axle)
LIBERAL DISCOUNT TO DEALERS

Weaver Manufacturing Co. 2165-9 So. 9th St.
Springfield, Ill.



SPLITDORF

"Always There"

Circumstances alter cases—

but let no circumstance alter YOUR SOUND JUDGMENT in the constant use of SPLITDORF COMMON SENSE PLUG.

The insulation of SPLITDORF PLUGS is high quality mica and designed and manufactured to absolutely withstand the breaking down effects of high tension current.

The design of the SPLITDORF central electrode is proof against all expansion and contraction.

The construction of the SPLITDORF shell allows small space for gas and its shape prevents all trouble due to pre-ignition on account of red-hot metal parts.

The SPLITDORF PLUG is less liable to short-circuit from carbon deposits than any other form of plug ever put out by any manufacturer.

STUDY SPLITDORF ADVANTAGES—TRY SPLITDORF PLUGS—then we know that whatever may be the circumstances SPLITDORF PLUGS will come first, last and all the time.

Remember, All! "New Ignition for old" is our slogan—we have a SPECIAL EXCHANGE proposition of the greatest interest to every owner of a gasoline motor who would save time and money. Write or call TO-DAY for particulars.



SPLITDORF ELECTRICAL COMPANY

ATLANTA, 8 Harris St.
BOSTON, 180-182 Mass. Ave.
CHICAGO, 64-72 E. 14th St.
DETROIT, 972 Woodward Ave.

KANSAS CITY, 1823 Grand Ave.
LOS ANGELES, 1226 S. Olive St.
NEWARK, 290 Halsey St.
NEW YORK, 18-20 West 63rd St.

PHILADELPHIA, 210-212 N. 13th St.
SAN FRANCISCO, 1028 Geary St.
SEATTLE, 1628 Broadway.
LONDON BUENOS AIRES

FACTORY, NEWARK, N. J.

When Writing to Advertisers, Please Mention Motor Age.

Another Letter Proving the Stamina of Maxwell "50-6"

WALL STREET GARAGE

C. L. ROGERS, Proprietor

Dealers in Automobile Supplies, Tires, Oils, Etc.

GARAGE AND REPAIR SHOP

WALL STREET

ATTLEBORO, MASS.. July 2 1913. 191

Mr. R. F. Coburn,
#410 Newbury Street,
Boston, Mass.

Dear Friend Coburn:-

You ask me what I think of the Maxwell "50-6". The answer is I have sold fourteen of them in this town of seven thousand population, and all of my customers are boosters. This ought to emphasize better than anything I can write you what they think of the car.

In my judgment the Maxwell "50-6" affords more comfort, convenience and general satisfaction than any car on the market, regardless of price.

It is as good looking as any car selling for \$5,000; will give just as satisfactory service and at half the cost of maintenance.

For power, simplicity, quietness and flexibility, I think the motor beats anything the industry has yet produced.

When a prospective buyers inspects the four and five thousand dollar cars and carefully notes "the reasons" why they get such prices, he is agreeably surprised to find them all in my Maxwell "50-6" - and at half the price, viz: Vanadium and Chrome Nickel steels throughout; Gray & Davis electric systems; Timken axle; Warner Speedometer; Luxurious Upholstery, and other details and appointments usually found only in cars at twice the price.

I understand you are practically sold out of this model. If so, don't fail to reserve several more for me, and I'll be up and see you the first of the week.

Yours truly,

C. L. Rogers.

Maxwell Motor Company, Inc., Detroit, U. S. A.

When Writing to Advertisers, Please Mention Motor Age.

THE BROWN IMPULSE TIRE PUMP



HOT WEATHER IS HERE

Are you going to sweat and strain inflating your tires like you always have or are you going to use a Brown Impulse Tire Pump and let your motor do the pumping?

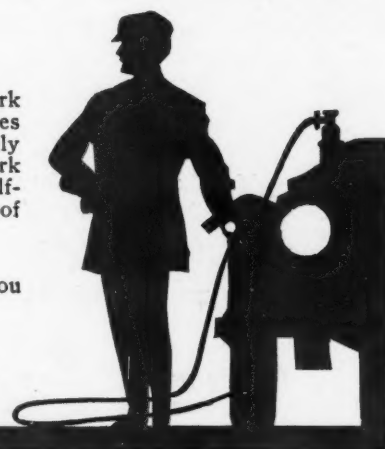
You'll spend \$15.00 for a Brown complete. You'll save this, strength and time enough to pay for it ten times over.

Be Sure It's a Brown Impulse Tire Pump

with a B'Co Quick Detachable Spark Plug. It's the only pump that attaches and detaches without a wrench, the only one that has a Quick Detachable Spark Plug, a Recording Gauge and Self-Opening Valve Connection as part of its regular equipment.

Ask your dealer. If he can't tell you about it, ask us.

The Brown Company, 120 Bellevue, Syracuse, N. Y.



Mr. Manufacturer: The Surest Way to "Profit by Your Mistakes" Is Not to Make Them!

The biggest single *opportunity* for the car manufacturer to make a mistake is *passed in safety* when he decides on the

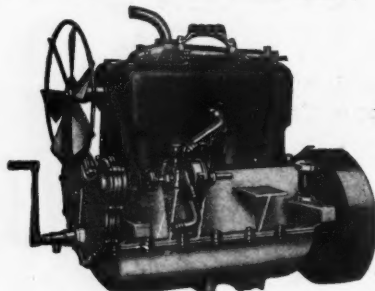
You can buy better and cheaper from a **SPECIALIST** than from your own "Motor Department"

"sweet tempered" BUDA MOTOR "The Part That Sells the Car"

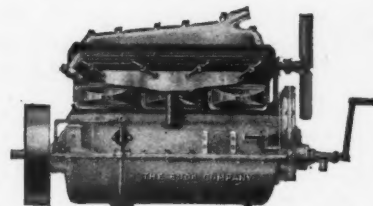
One reason *why* "it sells the car" is that car buyers have become aware of the unequalled worth of the BUDA Motor and (you know it's a fact)

When The CONSUMER Knows What He Wants,—"arguments are not in order."

His educated preference is a mighty force in your favor and to have him on your side, you must give him *what he wants*.



Buda Model "T"—4 cyl.



Model "SS" Buda "Little Six"

THE BUDA COMPANY

FACTORY, HARVEY, ILL. (Chicago Suburb)
Address all correspondence to our **FACTORY REPRESENTATIVES**
BRANDENBURG AND COMPANY

1108 SOUTH MICHIGAN AVENUE, CHICAGO

FORD BUILDING, DETROIT

57TH AND BROADWAY, NEW YORK CITY

1914 Specifications:

Model "SS"—6 Cylinder Motor $3\frac{1}{2} \times 5\frac{1}{2}$
Model "T"—4 Cylinder Motor $4\frac{1}{2} \times 5\frac{1}{2}$
Model "Q"—4 Cylinder Motor $4\frac{1}{2} \times 5\frac{1}{2}$
Model "M"—4 Cylinder Motor $3\frac{1}{2} \times 5\frac{1}{2}$
Model "M"—4 Cylinder Motor $3\frac{1}{2} \times 4\frac{1}{2}$
Model "SS" furnished either as separate Motor or with Bell Housing Crank Case.
Models "T," "Q" and "M" furnished either as separate Motors or with Bell Housing Crank Cases. Also either for sub-frame or main frame support.
Model "M" furnished in separate type only for sub-frame support.



A Complete Electric Lighting System for \$12.00

At last you can have an electric lighting system at a reasonable price. Just think of it—only \$12.00 for a set of four electric lamps and the necessary wire for installing same. The cheapest standard electrical equipment on the market would cost you almost three times as much to buy—and fully three times as much to operate. Do away with the rattle, dirt, bad odor and nuisance of refilling and polishing oil lamps and equip your car with

J-M MOBILITE ELECTRIC LAMPS

Operated by Dry Batteries

These lamps add to the neatness and attractiveness of an automobile. They are made of hard rubber, fitted with a Tungsten bulb, a powerful lens and reflector. Six No. 8 J-M Dry Batteries will operate a set of four lamps from 300 to 420 hours.

Used for dash lights, tail lights, speedometer lights and interior car illumination. Also for motor boats, camps, bungalows, etc.

Shipped direct from our nearest branch if not at your dealer's. Write today for interesting booklet.

Dealers wanted everywhere to handle this quick-selling accessory. Big sales and liberal profits. Write today for Special Dealer Proposition

H. W. JOHNS-MANVILLE CO.

Albany
Baltimore
Boston

Buffalo
Chicago
Cincinnati

Cleveland
Dallas
Detroit

Indianapolis
Kansas City
Los Angeles

Louisville
Milwaukee
Minneapolis

New Orleans
New York
Omaha

Philadelphia
Pittsburgh
San Francisco

Seattle
St. Louis
Syracuse

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED Toronto, Montreal, Winnipeg, Vancouver

2098

400% Increase In Two Years

—Is the Record Made by the GLIDE

The connection between this 400% increase and the dealer is shown on the profit side of the books of all our dealers—for our increased business means a corresponding increase for them.

If you are desirous of obtaining selling rights for the GLIDE in your locality write us. The selling possibilities of the GLIDE are tremendous, for the simple reason that a GLIDE dealer has a car that his competitor can't touch in quality or price.

Our liberal contract terms and proposition to agents has met with great favor from all our dealers. Write us, while territory is still open, and we will lay our plans bare before you. Address—

THE BARTHOLOMEW COMPANY, 215 Glide Street, PEORIA, ILL.

Glide

Worth
Twice
What Its
Price Indicates



Model 36-42, 5-Passenger Touring, Completely Equipped - \$1690

Star Features That Brought This Wonderful Increase:

Automatic Dynamo Lighting System.

Motor-Driven Tire Pump.

Unit Power Plant.

Long Stroke Motor, with enclosed valves.

Center Control.

Left Side Drive.

Electric Side Lamps in Dash.

Electric Headlights and Tail Lamp.

Self-Starter.

Floating Rear Axle with Pressed Steel Housing.

Demountable Rims (Baker Bolt-on).

118-inch Wheel Base.

Goodyear No-Rim-Cut Tires.

When Writing to Advertisers, Please Mention Motor Age.

When your
DAYTON AIRLESS
 tire strikes a stone—

the stone sinks into the tire, rubber is displaced, the "pier" (A) squeezes down and bulges out into the open spaces between (B). Naturally it follows that the tire passes over the stone with a very slight vibration or "bounce." With an air filled tire you are bound to get greater bounce—there is no outlet for the air and it therefore shoots away from the obstruction point and back again with a rush, throwing you into the air. Dayton Airless tires provide for the comfort—the ease that you must have.

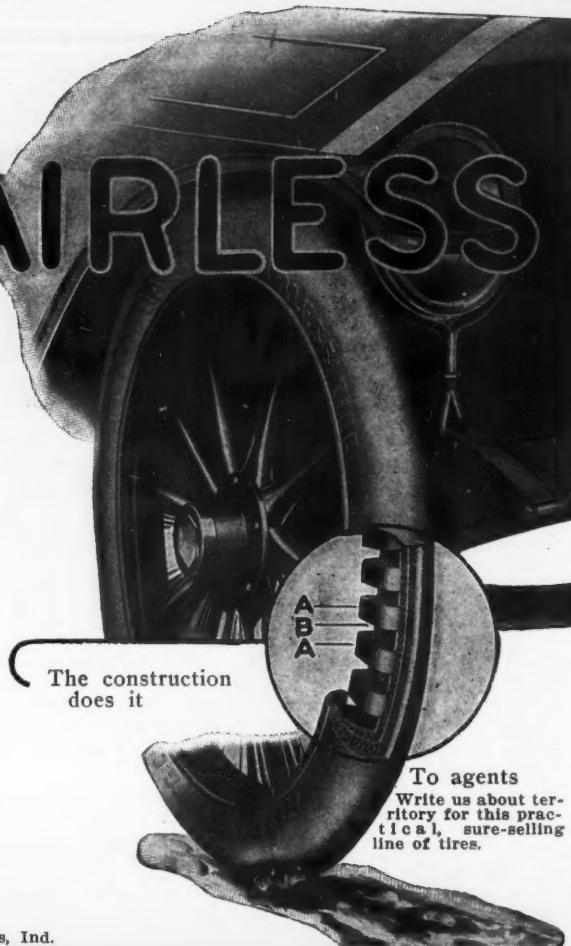
But much more; "airless" means complete freedom from tire trouble, punctures, blow-outs, etc., and the long train of worry, danger, delays, annoyance, expense.

"Air-free, care-free," and wear-free besides; they last longer than any other kind. We guarantee Dayton Airless for 5000 to 8000 miles, according to the weight of your car.

Ask us to prove these facts to you. Send for our Catechism; shows you that tire economy is not always in the first cost; shows you a newer kind of automobiling pleasure.

Dayton Rubber Mfg. Co., Dayton, Ohio

Dayton Airless Tire Co., 1878 Broadway, New York City.
 Dayton Airless Tire Co., 589 Boylston Street, Boston, Mass.
 Dayton Airless Tire Co., 80-84 West Mohawk Street, Buffalo, N. Y.
 Dayton Airless Tire Co., 2123 Michigan Avenue, Chicago, Ill.
 Dayton Airless Tube Co., 352 No. Illinois Street, Indianapolis, Ind.



To agents
 Write us about territory for this practical, sure-selling line of tires.

Billings & Spencer Tools

"The tools that are guaranteed"

Nickel plating B & S tools. One of many highly specialized processes through which B & S tools must go before allowed to leave shop.

Write for Catalog.



When Writing to Advertisers, Please Mention Motor Age.

A SIXTH REASON WHY

Practically All the Leading Car Builders are Large Users of



Easy to put on. No drilling or otherwise marring the car. Noiseless at all times. No further adjustment required and will outlast the car.

GABRIEL Rebound Snubbers

(Standard Equipment on the Easiest Riding Cars)
PEERLESS STEARNS WHITE

Reduce Tire Expense. Unchecked rebound of the springs bounces car body and wheels off the road. Nothing buffs off tire treads quite so quickly.

By gradually checking the rebound of the springs, Gabriels keep the wheels on the ground, saving tire treads besides giving better traction and control of car.

Every device that retards the down-stroke of the springs places just that much sudden weight-strain on the tires, that the springs ought to bear. Gabriels don't retard the down-stroke. On the contrary, unlike other devices, they give you the full easy-riding quality of the springs on smooth roads besides minimizing jolts and jars on rough roads.

Treat yourself to a Demonstration. Let us send you catalog and name of our nearest dealer

GABRIEL HORN MFG. CO., 1415 E. 40th ST., CLEVELAND, O.

Makers of the Famous GABRIEL Musical Horns and Auto Accessories.



TRANSMISSIONS

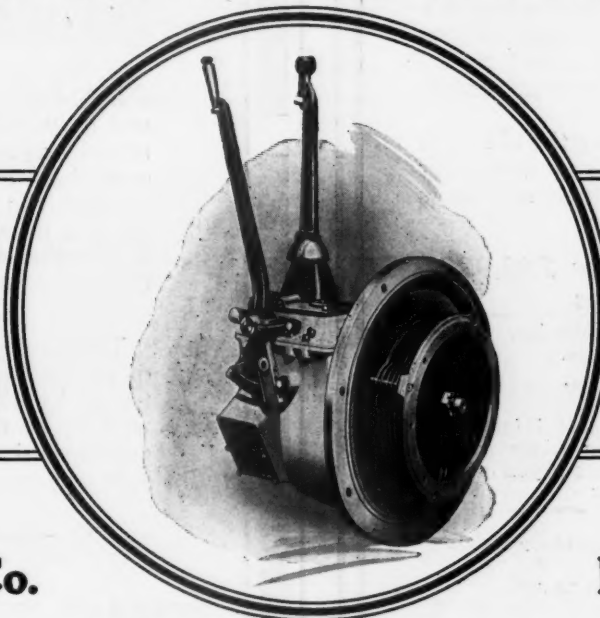
STEERING GEARS



"The Value of our Product is not in its Price—But in the Service Rendered"

STARTERS

Introducing to the trade our model T29 transmission with the C-19 control levers. This assembly is a light four speed transmission, direct drive on third speed, mounted on either annular or roller bearings. The gears are $\frac{3}{4}$ " face, six eight pitch. The control set is of the ball joint, dirt proof type of center control, right or left hand. As noted in



the cut the design eliminates all holes in the flooring of the car. The clutch is a new design, being an extra heavy multiple disc type, all wearing parts being hardened, and adjustments for spring tension and clutch pedal position are also taken care of. Write immediately for detail print of this assembly. It is bound to interest you.

CLUTCHES

**Warner
Gear Co.**

**Muncie,
Indiana**

DETROIT OFFICE—628 FORD BUILDING

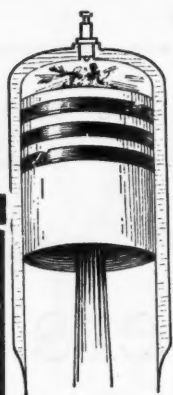


DIFFERENTIALS

CONTROL LEVERS



When Writing to Advertisers, Please Mention Motor Age.



What are Piston Rings used for?

All motors have piston rings.

They are placed on the piston head and should minimize the leakage of compressed vapor between the piston head and cylinder, to approach as nearly as possible to perfect compression and so to obviate loss of power.

Now then—this being the case—the piston rings that will most perfectly perform this duty are bound to be your greatest economizers of fuel as well as your greatest conservators of power. The name of these rings is



Piston Rings

(PATENTED)

Made of Processed Gray Iron, softer than the cylinder. They retain equal tension and do not wear the cylinder or mar its perfect roundness. On the same principle that they eliminate leakage of gas they minimize carbonization and resulting engine troubles. The gas can't escape down—oil can't go up.

As great an advance over the old style piston rings as the old rings were over the plain piston head without any rings at all. They pay in power.

**Now in Use on Over 150,000
Automobiles**

May be obtained at all up-to-date supply houses, garages and repair shops.

"Ask the User"

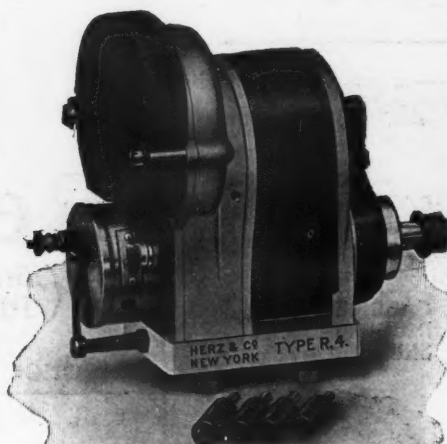
A booklet on request—complete information as to how Leak-Proof Piston Rings can be applied to your piston problems if you'll write us, or call or write any of our

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Manufactured by

McQuay-Norris Mfg. Co., Dept. St. Louis, Mo.



HERZ MAGNETO

HERZ MAGNETO is far superior to other Magnetos. In the official English test against 15 competitors, it was adjudged the most efficient Magneto of its size and weight by 25%.

HERZ MAGNETO is small and light, and absolutely protected against atmospheric conditions, dust and moisture. It was run completely submerged in water for 16 days at this winter's New York and Chicago Shows.

The strength and reliability of HERZ MAGNETO are attested by the fact that it is used by so many of the most experienced motorists.

HERZ & CO., 295 Lafayette St., New York
Makers of the HERZ PLUG

1st Aid In Cleaning



Old Dutch Cleanser

Stands first in finding uncleanliness and first in removing it

Where dirt and grease stick hardest, and stains and discolorations are most stubborn, Old Dutch Cleanser takes hold with extra power.

Lavatories, floors, woodwork need it. Absolute cleanliness and sanitation come with the use of it.

Old Dutch Cleanser never fails to clean—quicker and easier than anything else.

Many uses and full Directions on Large Sifter Can. **10c**



Don't ENVY the Owner—Be One!

Instead of watching the "other man," get the benefits of the Taylor "NOIL" Tire Pump yourself—put one of these labor savers on your own machine. Now, when your tire goes flat, it's pump, pump, pump! Makes no difference whether it's drizzling, cold, or sizzling hot that tire **MUST** be inflated. And it will be—without **ANY** laborious hand pumping—if you use a

**TAYLOR
"NOIL"
TIRE PUMP**

Newest yet most successful engine driven tire pump. Will be installed at your request by any of the leading manufacturers or their local dealers.

Ends Labor—Saves Tires

The Taylor "Noil" Tire Pump is permanently attached under the hood of your machine. The engine does all the work. All you do is attach the hose to the tire, turn on the power, and watch that tire come up!

But the big reason why this pump has been so astonishingly successful is this: It works on the plunger and diaphragm principle. And

that means the exclusion of all oil from the air chamber. And **THAT** means no oil or oily vapor can **EVER** get into the inner tube to spell tuberculation.

The diaphragm and plunger is solely responsible for this **GREAT** advantage. And you'll find positively **NO OTHER** mechanically operated tire pump on the market working on this principle and getting these **saving results**.

Dealers!

Here's an automatic profit maker. Sells on sight. This pump is easy to attach. Get our **LIBERAL** offer **TODAY!** **WRITE!**

Easily Applied

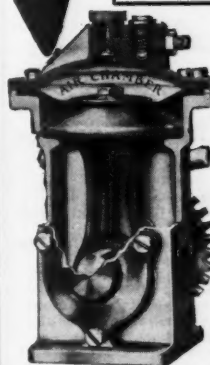
That's another big advantage for the Taylor Pump. Any mechanic can put it on in a little while. Special brackets are supplied, these being designed especially for each of the leading automobile makes and models.

2 Big Savings

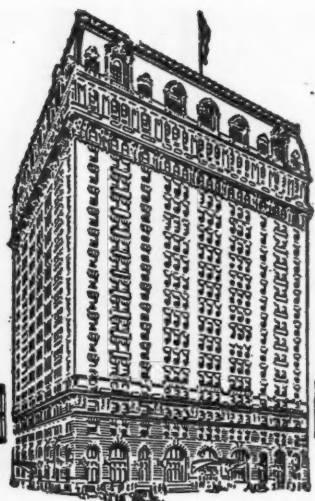
First—an enormous saving of work and trouble. **Second**, a saving of tires due to the "No-Oil" feature. This together with the fact that tires can be kept pumped to full pressure means a surprising increase of tire mileage—enough more to pay for this pump several times over.

Write for Interesting Circular

Shows how simple this pump is, how easily it can be applied, and why in such a comparatively short time it has come into such wonderful favor. When you write, please be sure to tell us the make, model, and year of your car.



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Box 485-N
Chicago, Ill.



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Two persons\$5 to \$8 per day
Four persons\$8 to \$15 per day
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Starts — Lights — Ignites

REMY

Six Volt System—Does-It-All

THERE is only one real way to provide for the efficient starting, lighting and ignition of your car.

Have one manufacturer design and build all three systems; have this one manufacturer responsible for all three.

We are the only concern building the complete apparatus—either as a whole or in any combination—starter—lighting equipment—magneto, or battery ignition (generator and storage battery). The starting and lighting equipment is sold only to automobile manufacturers.

Write for our magneto exchange offer.

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BRANCHES:
New York Detroit Kansas City Minneapolis
Boston Chicago San Francisco

(Service stations throughout the country)

Motor Ignition Appliances

A Practical Treatise

on the Application of Electricity in the production of the Ignition Spark in Petrol Motors

By T. H. HAWLEY

Author of

"Motors in Principle and Practice," "Petrol Motors Simply Explained," etc.

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III. A Brief Explanation of Some Electrical Terms Commonly Used.
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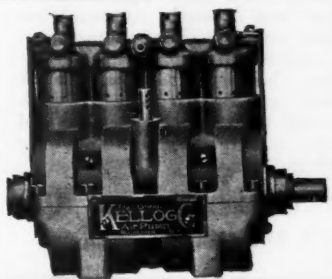
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Can there be any further proof of the almost universal use of the Kellogg; could we advance any stronger argument why it is the pump you should have on your car?



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Over a million satisfied users in twenty-eight years and not a fire traceable, directly or indirectly, to the use of Bowser equipment—they simply cannot explode, because they are built to conform to that measure of safety prescribed by the National Board of Fire Underwriters.

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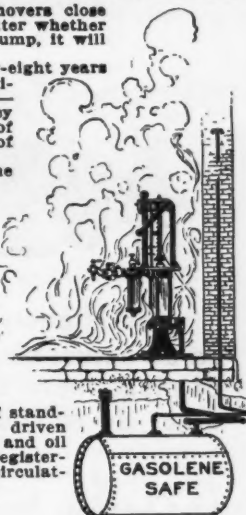
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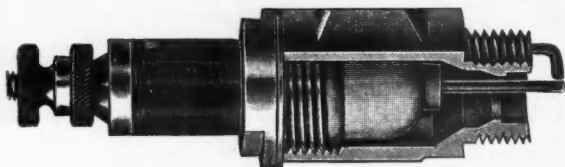
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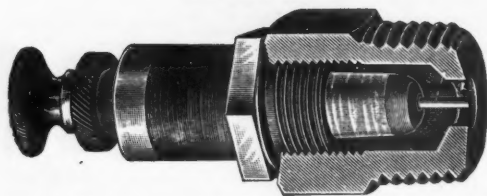
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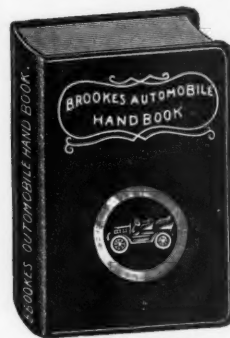


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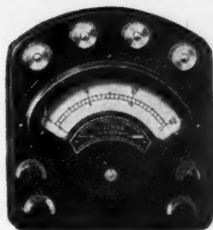
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**Every Automobile and
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should possess a reliable, durable, convenient Electrical Measuring Instrument



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Portable Testing Instrument

**Weston Miniature Precision
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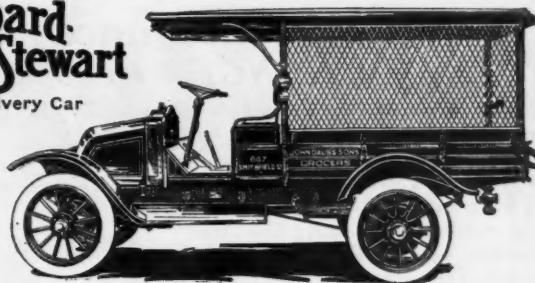
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The Delivery Car



The Lippard-Stewart Stands for Business Economy

The Lippard-Stewart 1500 lb. Delivery Car pays for itself in little time with the money that it earns and saves. It lessens overhead. It will deliver more goods over a wider territory at less cost per package than is possible with horse and wagon. It guarantees better and quicker service. It increases your scope of delivery and enables you to increase your trade. It helps overcome competition and advertises your progressiveness.

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Fool proof and simple in construction—easy to drive and readily accessible, it is really the delivery car for every business man everywhere. Write for full information.

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TO GET IN THE TRUCK
BUSINESS RIGHT."**

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"Tonneau"
Refrigerator
Basket

"A rest and a **Hawkeye** add zest to the trip"

Refrigerator Baskets



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(2)

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Rate with Bath
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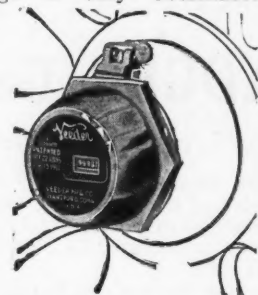
won't do, if you want to know the exact cost of upkeep of pleasure or commercial vehicle. Mileage must be correct to a fraction if you are interested in tire, gasoline or "juice" and lubricating consumption. Exact mileage is only obtainable with a VEEDER HUB ODOMETER—which can't be tampered with.

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210 S. Michigan Ave., Chicago

THIS work gives full and clear instructions on all points relating to the care, maintenance and repair of Stationary, Portable and Marine, Gas and Oil Engines, including How to Start, How to Stop, How to Adjust, How to Repair, How to Test.

This book has been written with the intention of furnishing practical information regarding gas, gasoline and kerosene engines, for the use of owners, operators and others who may be interested in their construction, operation and management.

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84 Miles on a Single Gallon of Fuel

All mileage records were broken on June 21st, 1913, by a Franklin car equipped with a

Newcomb Carbureter



You are doubtless familiar with this test—why not get familiar with the carburetor that meters out and atomizes the scientifically correct amount of fuel for every driving condition.

Send for Booklet 160M and Reprint

The Holtzer-Cabot Electric Co.
Chicago, Ill. Brookline, Mass.

EMPIRE

Porcelains—

You can crack them with a hammer

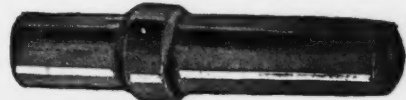
No motor cylinder has ever become hot enough to crack one of them, however. And it's in the cylinder that a spark plug COUNTS—not under a hammer.

Spark plug manufacturers who want a porcelain that is as tough and rugged as human hands can make it, will specify "EMPIRE."

Manufactured by expert workmen, of specially selected kaolin imported from Cornwall. Fired at a temperature of 2,600° F.—many times greater than any heat met with in actual service. Subjected to brutal efficiency tests for breakage and long life.

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Empire China Works
142-156 Greene St., Brooklyn, N. Y.



U-S-L



U-S-L

Takes the place of the Fly-wheel

The U-S-L Electric Starter and Lighter is a combination motor and generator that takes the place of the fly-wheel. The armature of the motor-generator is bolted directly to the engine crank-shaft.

The U-S-L doesn't add a single extra moving part to a car.

No gears or chains	No extra clutches
No added weight	Starts at a push of foot-button
No bearings to oil	Supplies ample current

Adopted by
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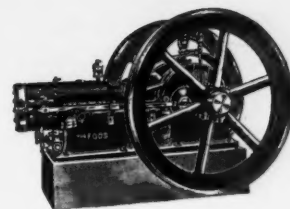
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Branch Offices and Service Stations—New York, Boston, Buffalo, Cleveland, Detroit, Chicago, St. Louis, San Francisco.

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BULLETIN No. 53.

Foos Gas Engine Co.
Springfield, Ohio.

The Searchlight Gas Co.

1016 Karpen Building
CHICAGO, ILLINOIS

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With Laminations of .002" or of .003".

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On sale by all leading jobbers and dealers.

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A completely equipped Light Six which will meet the big demand for a really high-class car of this type.
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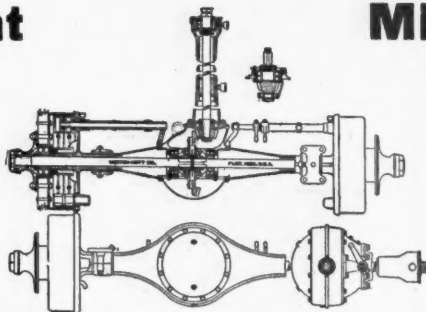
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KEATON NON-SKID TREAD
has four times the wearing service of the ordinary non-skid. Users will tell you that they have run Swinehart Keaton Non-Skid Tread Tires a whole season without having them lose their anti-skid effectiveness. Call at any one of our stores and investigate them. We also make a complete line of Smooth Pneumatic Tires of best quality. Branches and distributing agencies in all leading cities.

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*Electric Self-cranking, Electrically Lighted
Four Forward Speeds*

"Six Thirty-six" Touring Car and Roadster, \$1850
Model 30 Touring Car...\$1350 Model 30 Roadster...\$1250

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Diamond SAFETY TREAD
(Squeegee) TIRES
Won't Slip - Won't Slide
Won't Skid - They Grip!

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Subsidiary of The B. F. Goodrich Co.
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represent the last word in the art of truck body building. They stand for strength, stability, sturdiness and efficiency. Made entirely of steel, they will not rot or crack. They cannot warp or split. They will stand the maximum use or abuse and are practically indestructible. They eliminate fire risk. They are light in weight and easy on tires—pleasing in design and attractive. Summed up in a word, they give the highest degree of Service.

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Torpedo Type
Price \$20

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We Specialize in High-grade Automobile Parts

Transmissions
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Great Western
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1913 FULLY EQUIPPED \$1585
LUXURY — POWER
ABSOLUTE SILENCE
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Fitted With HOUK Quick Detachable Rims

Make for greater resiliency, smoother riding. Save tires. Are quickly and easily removed. Practically indestructible. Absolutely rust-proof. Now being manufactured in America by the Standard Roller Bearing Company, of Philadelphia.

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NO HILL TOO STEEP
NO SAND TOO DEEP

Olympic	"four"	\$1500
	Five passenger.	
Majestic	"four"	\$1975
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	Seven passenger.	
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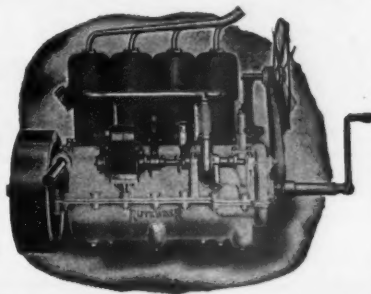
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OPERATES FROM MAGNETO—NO BATTERIES NEEDED



Why "HI-LO" is horn perfection.
No vibrator contacts to adjust.
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Anyone Can Attach It in 15 Minutes

GUARANTEED

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The Ford magneto never gives out—Just a little of its surplus energy is sufficient to operate the "HI-LO." Be down-to-the-minute and order a "HI-Lo" from your jobber or dealer or remit direct to

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Electric
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Self
Starting

SERIES "S"—45 H. P., 2, 4 and 5 Pass.—\$2,300

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New Six Passenger, Coupe and Limousine
Bodies slightly higher.

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Pioneer Six-Cylinder Car Builders of America

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Gives
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MOTOR TRUCKS

THREE EXCEPTIONAL MODELS:

Model ED—1,000 lbs. capacity (3 cyl.).....\$ 750
Model B—1,000 to 2,000 lbs. capacity (4 cyl.)..... 1,100
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Write us for full information and liberal specifications.

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WATERLOO, IOWA

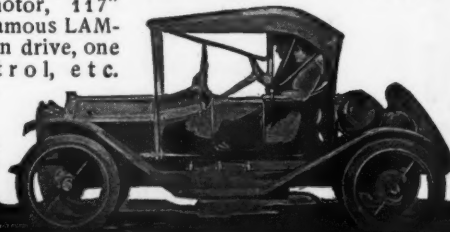
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The LAMBERT Model 99 (5-passenger touring car or 2-passenger roadster) at \$1365 (fully equipped) stands It comprises 4 1/2 x 5 1/4

at the head of its price class.
Rutenber motor, 117" wheelbase, famous LAMBERT friction drive, one lever control, etc. Write for catalog.

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Electric Starter
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**SIX \$2000
FOUR \$1650**

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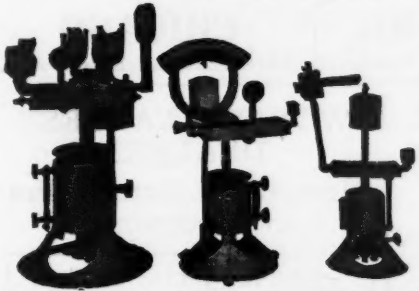
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The vulcanizing system that DOES NOT use air bags. SOLID PADS and HEAVY CLAMPS are the means through which pressure is generated.

Plants from \$25 to \$500

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Efficiency of Identical Spring Equipped with AMES-92682 Shocks Failure

CHART SHOWING COMPARATIVE TESTS ON THE LIFE OF A SPRING, SHOWING 497 PER CENT. EFFICIENCY OF AMES AUTOMATIC SHOCK ABSORBER IN PREVENTING SPRING BREAKAGE

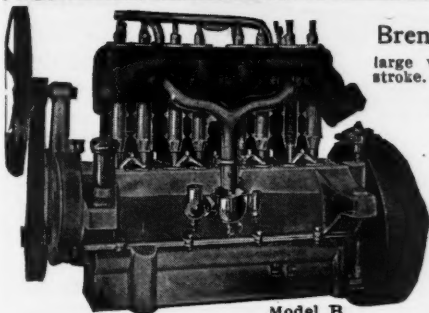
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AUTOMATIC
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POWER - DURABILITY



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Brennan's New Model
large valves, large bearings, long stroke. Adapted for all types of cars and trucks.

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Patented April 2, 1912, April 1, 1913
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Through merchandizing strategy we have remedied these flaws. May we tell you about these things and about our kerosene-burning car, equipped with wire wheels, cowl dash, cowl gasoline tank. Left drive, center seat control—the most salable car offered today.

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THE SILENT CAR

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Repairer attached to spring broken in center at spring bolt—common occurrence. Taken in time by attaching Auto Spring Repairer, there need be no cause for alarm. May be placed in other positions wherever springs are broken.

(Manufactured Under a Basic Patent)



The Auto Spring Repairer will carry broken springs intact and in working order even for weeks, until the broken spring can be replaced with a new one.

WARNING TO THE TRADE—We are the sole owners of the basic patent on the AUTO SPRING REPAIRER and will promptly prosecute any infringers of this patent.

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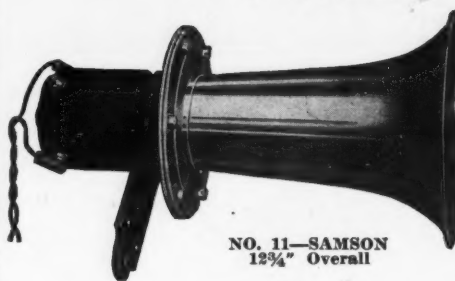
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CAN BE HANDLED BY ONE PERSON AS EASILY & QUICKLY AS AN UMBRELLA
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**Loud
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Marmon "32"

Four cylinders, 32-40 h. p., 120-inch wheel-base, electric starting and lighting system, left-hand drive, center control, nickel trimmings, with newest body types to meet every requirement and corresponding equipment.

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"Sixty Years of Successful Manufacturing"

Blood Bros. Universal Joints

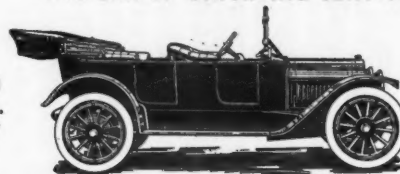
Style A will run 50,000 miles with one filling of the grease caps

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\$1950
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Completely
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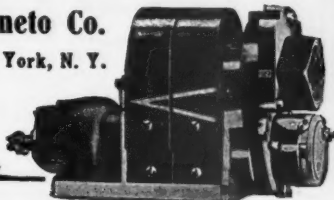
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Quality—not only as to efficiency and manufacture, but in design as well—characterizes all Eiseemann Ignition systems. Not only do they insure hot fat sparks at all speeds—but they are simple, accessible and fool proof.

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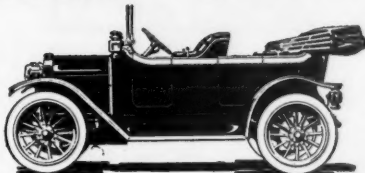
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The *Detroit*—\$850 FULLY EQUIPPED

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Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car

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Makes possible the use of airless tires without sacrifice of easy riding.

Doubles the life of any set of tires.

Increases life of motor and adds to the mileage per gallon of gasoline or per charge of electricity.

Makes any car ride like a cradle.

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Are unexcelled for long mileage and endurance. Ask any user.



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COVER THEM WITH
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Each section 2 in. wide. They hook to rims. Try two or three sections over any old blowout.

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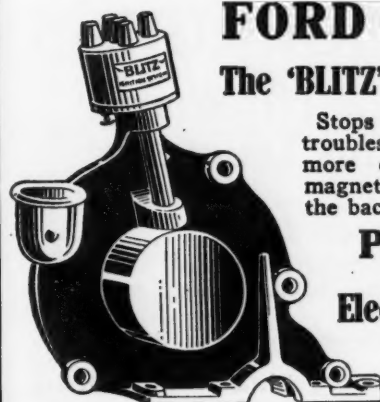
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Stops all of your ignition troubles. Makes your car more efficient. Uses Ford magneto current. Eliminates the back kick.

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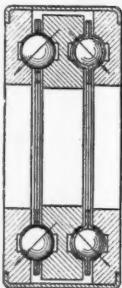
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SUSPENSION BALL BEARINGS

Two Rows of Balls and All Balls Loaded All the Time

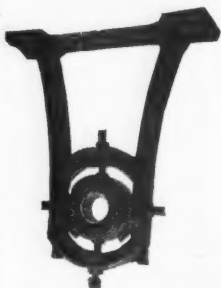


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We also make Plain and Grooved Thrust Bearings

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One, Two, Three and
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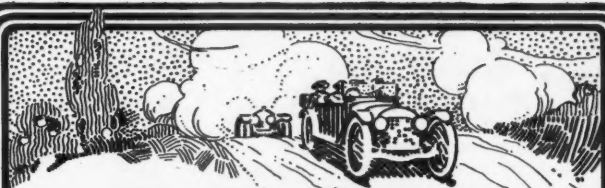
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Everything In Sheet Metal for the Automobile.

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More power - Less fuel - Wider range
FINDEISEN & KROPF MFG. CO.
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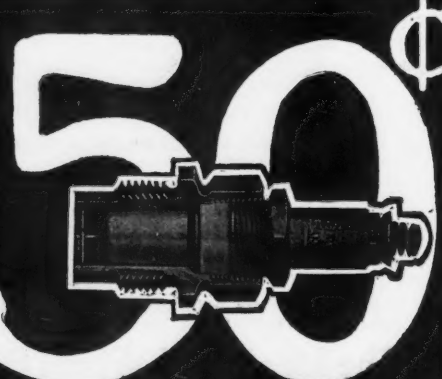
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Model 45, \$2750

6 Cylinder, Left-hand Drive
Center Control
132-inch Wheel Base.

INTER-STATE AUTOMOBILE CO.
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The STANDARD COMPANY Torrington, Conn.

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The Pathfinder chassis is a composite of the best proven ideas in European and American practice—built to withstand rough usage and to remain quiet even in "old age." The Pathfinder "selling plan" is one you will be glad to know about. It is unique and comes to you in the form of the "101 Reasons," a short, concise course in Pathfinder salesmanship. Yes, it is absolutely different—better write today, NOW!

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Saves
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LE TÉLESCO is the only Spring and Hydraulic Shock Absorber. A trial convinces.



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A Solar Lamp for every motor need.

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The BENTON

The Spark Plug that is water-proof, gas-proof, soot-proof, fool-proof and proof against competition.

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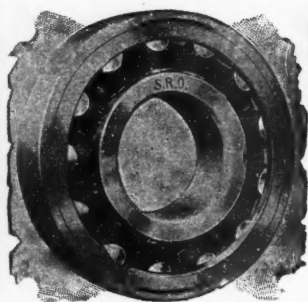
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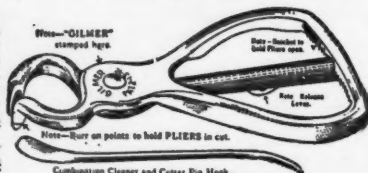
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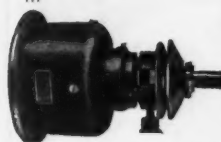


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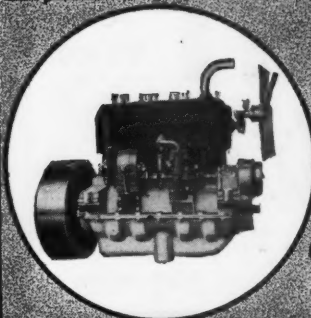
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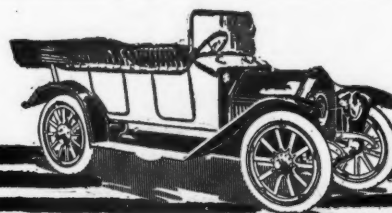
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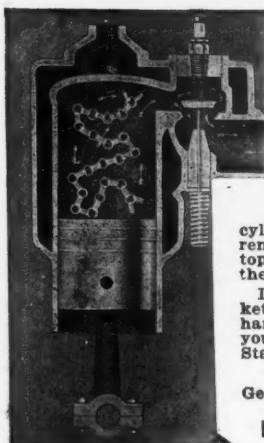
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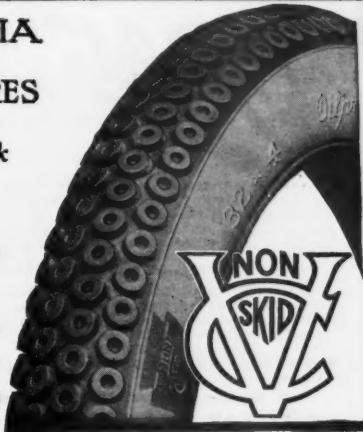
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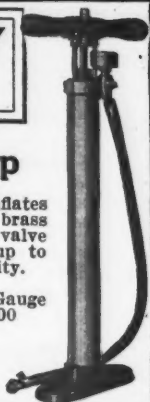
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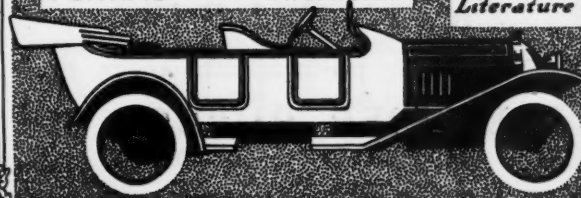
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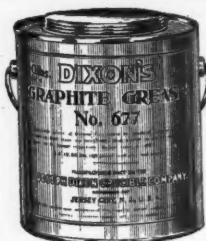
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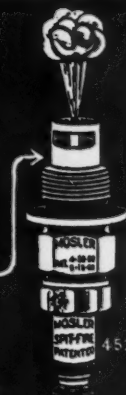
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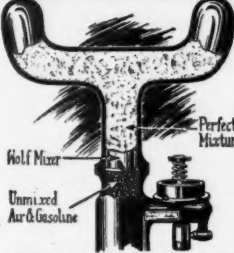

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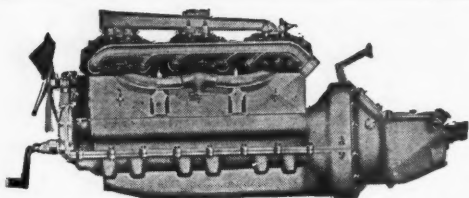
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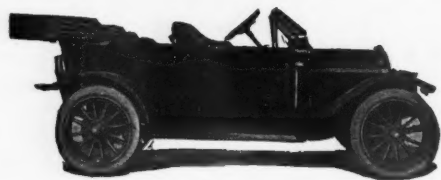
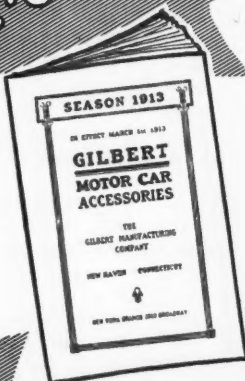
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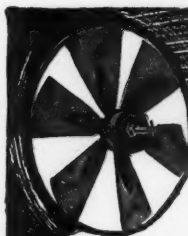
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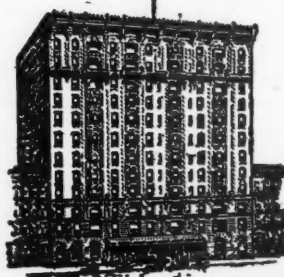
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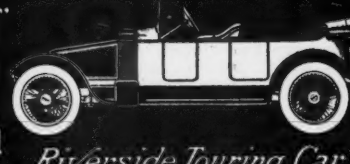


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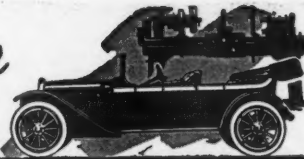
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Sil-Cote cleans and polishes the nickel and deposits a coating of pure silver on all parts where the brass shows through. Changes brass to silver plate with one application. If your dealer has none, take no substitute. Send 25c for trial size of genuine Sil-Cote. Other sizes—½ pint, 60c; 1 pint, \$1; 1 quart, \$1.75; ½ gallon, \$3. Dealers write for agency proposition.

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Have a beautifully nickel plated car. Make her look just like a \$5000.00 one. It's just as simple; you can do it all in the time it takes to polish brass, and then you're done. No more brass polishing. Not a cheap silver or mercury wash, but a real permanent plate, that will wear as long as your car. Remember: QUICK-KNICK does it. The only plater that is absolutely reliable. Price \$2.00 complete, at your dealer's or send to us. Remember the name and insist upon QUICK-KNICK.

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on your car will make you the envy of the town. Everybody who has one is more than pleased. Looks so good to car owners that anybody can make money selling them. Installed in 5 minutes, with wrench only. Blown on a new principle, giving it the power of a locomotive whistle. Our agencies are valuable. Write for circular and cut.

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Mechanically attached, without springs or clamps. Gives quick, reliable and everlasting service. Price, 35c each.

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Other specials listed in our Bargain Sheet

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28x3	\$ 7.20	\$1.90	\$1.80
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I HAVE A CAR WHICH COST ME \$2,850. It is a 1910 model and is now in the hands of the manufacturer, having had a complete overhauling of the motor, transmission and differential. The car has been supplied with fore doors, nickel trimmed, repainted and re-finished throughout. The upholstery and top have been renovated and the car, in appearance, is almost equal to a new one and for service is just as good as any new car on the market.

I find the rebuilding charges are more than I can afford to pay at this time. If I can realize \$200 and allow the purchaser to pay for the rebuilding charges on this car I would be glad to render bill of sale for the same.

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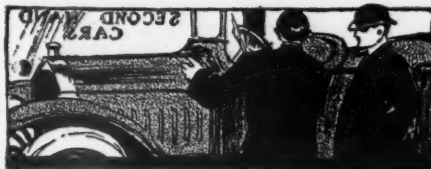
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Having purchased the repair business of the Henry Motor Co., we are prepared to fill orders promptly for repairs for Henry cars.
Muskegon Automobile Co.,
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A WHITE STEAMER GENERATOR AND burner, almost new. Will sell cheap. Address Box D 245, c/o Motor Age.

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All Types and Sizes.
We also repair or exchange all makes of ball bearings.
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You can save one-half your tire expense and nearly all your tire trouble by using Security Reliners. Many of our customers run their cars the entire season without blowout or puncture and without spending a cent for tire repairs.

YOU CAN DO IT YOURSELF.

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Schebler Carburetors, slightly used: Model L 1 1/4", \$7.50; Model L 1", \$6.75; Model O 1 1/4", \$8.50. Same carburetors, brand new, \$9.50, \$8.50 and \$11.50, respectively. Gas Headlights, 10" front, enameled black and nickel, finest lamps made; worth \$20.00 pair, our price \$9.50 per pair. Brass Windshields, genuine plate glass, complete with fittings and filler board, 41" wide, \$3.50. New 4-cyl. Jacobs-Brandow coils, kick switch, \$11.50; Disco self-starters, 4-cyl., \$5.00. Other bargains. Get our bulletin. Automobile Appli-ance Co., 1712 Michigan Ave., Chicago, Ill.

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The repair business of the Bergdoll cars, together with all drawings, jigs, patterns, etc., has been purchased by us. We have a complete stock of repair parts for all models on hand and orders for parts for Bergdoll cars should be placed with us direct to save time.

Louis J. Bergdoll Motor Co.,
124 N. 3rd St., Philadelphia, Pa.

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VULCAN PROCESS CO.
Factory and Office: 25th and University Ave.
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We manufacture and keep on hand all repair parts for the Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

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Includes parabolic reflectors, tungsten bulbs, wiring switch and free delivery.
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Foot throttle or accelerators, \$1.50. Lincoln Machine Shop, Lincoln, Ill.

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Doors made for all makes of cars. Guaranteed prompt shipment and a very good fit. We have patterns for most every car. F. E. Lortz Co., 9201 Hough Ave., Cleveland, Ohio.

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FORE DOORS

AT

CUT PRICES.

To reduce stock we are offering big reductions on all our standard Fore-Doors. Write today and secure a bargain while they last.

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Auto Specialty Manufacturing Co.,
Indianapolis, Ind.

"GET BUSY SALE!"

Large automobile factory purchased outright! Everything at a price! Must move at once! Axles—Radiators—Steering Gears—Magneto—etc. Anything and everything! Send for bargain list.

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Detroit, Mich.

GUARANTEED BATTERIES.

6 volt 140 Amperes.....\$16.00
6 volt 80 Amperes..... 13.00
6 volt 60 Amperes..... 10.00

The Ampvo Battery Co.,
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GUARANTEED ELECTRIC HORNS, MADE by well-known manufacturer. Regular price \$8. Our price \$5. F. E. Alford, Goshen, Ind.

IF INTERESTED IN A REAL SHOCK AB-sorber that will really make your car ride easily and save you tire and car expense, write The Blackledge Mfg. Co., 2112 Michigan Ave., Chicago, for printed matter.

GUARANTEED RADIATORS

For all cars. The following is our stock list of radiators for the cars mentioned, subject to immediate shipment. Compare our prices with other lists.

Ford Model "T".....	\$18.00
Buick 10-22-33-14.....	27.50
Buick F-16-17-19-26-27-28.....	35.00
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Hudson 20.....	33.00
Chalmers F-40.....	30.00
Lion 40.....	25.00
Warren 40.....	28.50
E-M-F 30.....	30.00
Flanders 20.....	30.00
Brush A-B.....	17.00
Anhut.....	15.00
Northern C.....	32.00
Wayne 30.....	35.00
Special 40 H. P.....	15.00

Terms: One-third cash with order, balance with order.

When ordering state year.

AUTOPARTS MANUFACTURING CO.,
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"Please change our advertisement to read as per enclosed matter. Run until further notice. We have steadily secured excellent results from our ads in MOTOR AGE and are more than satisfied."

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theft?

Cranklock prevents theft, promotes security.

Write me personally regarding this.

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KEROSENE FOR AUTOMOBILES

Our new Model B uses successfully half and half mixture lowest grades kerosene and gasoline. Satisfaction guaranteed or money refunded. Greatly increased power; very slow speed on high. Starts easy at zero. Special agents' prices. Dept. B.

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LANDAULET BODY

For any Straight sill. This body is in A No. 1 condition and will prove a bargain to the first purchaser.

Modern Autop Co.,
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LAUGH AT TIRE TROUBLE

Use Standard Tire Protectors. Tire expense reduced two-thirds. Write today for our valuable accessory catalogue.

New York & Brooklyn Auto Supply Co.,

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LUBRICATE YOUR SPRINGS AND GET some riding comfort. When they become rusty and set they are like solid bars. The (TOWNSAN) Spring Lubricator is a finely finished flat-jawed tool for wedging the leaves apart, permitting lubricant to be inserted between. A tool for mechanics or thoughtful car owners. Price, postpaid, \$1.50. Townsan Auto Spec. Co., Mitchell, S.D.

LATEST FORD ROADSTER BODY, \$35. Tops, curtains included. MacInnis Bros., Toledo, O.

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We have on hand a complete stock of repair parts for all models of Lion Cars.

Lion Motor Parts Co.,
124 N. 3rd St., Philadelphia, Pa.

MACHINE SHOPS AND GARAGE—OUR

WELD IT ALL machines will weld perfectly any broken casting that has a melting point. Full particulars on Oxy-Acetylene welding machines sent on receipt of your address. Every machine fully guaranteed. H. D. Prose & Co., Wichita, Kansas.

MAGNETOS: WE HAVE 2,000 MODEL X Splittorf Magnetos, new. Price, without coil, \$17.50 each; with coil, \$25.00 each.

The regular price of these is \$75.00.

We also have other makes of magnetos at cut prices, in fact everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money-saver in the world.

TIMES SQUARE AUTO CO.,
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S. W. Cor. 56th St. & Broadway, N. Y. City.

MR. (FORD) OWNER AND GARAGE MAN

The Townsan Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price \$1.50 by mail. Ask your jobber, or address Townsan Auto Specialty Co., Mitchell, S. D.

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We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

NEW FOREDOOR 5-PASS. BODIES,

trimmed and painted.....\$75.00
5-pass. metal bodies, unfinished..... 10.00
Splittorf spark plugs, per four..... 1.60
Stamwood steel running boards, 9½"x 48"..... 1.00
Martindale & Millikan, Franklin, Ind.

NEW H. T. SWISS 4-CYL. MAG-

netos.....\$ 30.00
Black Gas generators, each..... 1.00
Side oil lamps, suitable for trucks, pair 4.00
Gas head lamps, pair..... 4.90
New Sheldon shaft drive axles..... 40.00
I-beam front axles complete..... 18.00
34x4" wheels, Q. D. rims, set 4..... 10.00
34x3½" wheels, Q. D. rims, set 10.00
New 4-cyl. 20 H. P. air-cooled motor.. 70.00
2-cyl. Northern motor and transmission 70.00
New 6-cyl. Beaver motor and clutch.. 300.00
Milwaukee motor, 45 H. P..... 175.00
2-cyl. Sears motor, carburetor..... 50.00
4-passenger upholstered bodies..... 55.00

Get our list before buying.

Auto Parts Co.,

513-31 Jackson Blvd., Chicago.

OUR AD IN THE CLEARING HOUSE SEC-tion will interest every owner of brass trimmed cars. Just turn to page 115 and look it over, we know it will interest you. Look for the name QUICK-KNICK.
Forest City Sales Co., Fremont, Nebr.

OXY - ACETYLENE WELDING PLANTS, \$65.00 to \$175.00; send for circular.

Victor St. John,
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OXY-ACETYLENE WELDING AND CUT-ting Machine. The Admiral Welding Machine is built by men who know; large capacity; self-generating; portable; perfect for all classes of work. Send for booklet, "Welding and Cutting." Price, with Welding and Cutting Torches, all Filler Rods, Fluxes, Chemicals, etc., ready to begin earning big money, \$250.

We do expert welding; prices right.
Admiral Welding Machine Co.,
1331 Walnut St., Kansas City, Mo.

RADIATORS—NEW GUARANTEED GOODS

Ford, Model T.....	\$16
Buick Model 10.....	22
Buick Model F.....	25
Chalmers-Detroit.....	20
Everett.....	20
Stoddard-Dayton.....	25

Any other make required at equally low prices.

Times Square Automobile Co.,
1210-1212 Michigan Ave., Chicago.

SCHEBLER MODEL "L" CARBURETORS. new, 1 1/4 or 1 1/2-inch, \$8.00 each. Order early. Kent Motor Car Co., Kenosha, Wis.

SEAT COVERS FOR ALL CARS—SPECIAL price on Fords. We clean old covers; make them look like new. Auto Cape Top Co., 2334 Michigan Ave., Chicago.

STEAM VULCANIZERS, A LITTLE DE-vice made yourself, added to your vulcanizing plant makes every casing repair job a perfect success. Absolutely no failures, comebacks or dissatisfied customers. Write today for complete instruction how to make and operate. Price one dollar. Circular free. T. C. Armstrong, Los Angeles, Calif.

TOPS BUILT, RECOVERED AND RE-paired.

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B. Presto Tanks (medium).....	7.50
E. Presto Tanks (small).....	6.00

Ship in any quantity C. O. D. or S. D. B. L.
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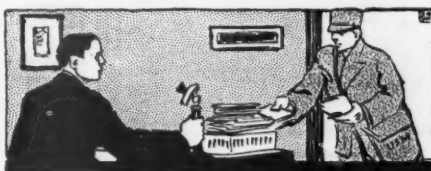
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32x3 1/2	16.00	35x4 1/2	28.00
32x4	20.00	36x4 1/2	29.00
34x4	22.50	36x5	31.50
36x4	24.50	37x5	32.50

I do not carry any but standard make tires or deal in inferior brands. I will ship any size tire listed above to any part of the U. S. upon receipt of 10% of order, balance C. O. D.

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34 x 4	17.25	4.65
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Send 10% for express charges, bal. C. O. D. Allow Examination.

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Size.	1,000 TIRES 1,000	Our Price.	Size.	Our Price.
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32x4\$15.00	36x4 1/2\$23.00	
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10% with order; bal. C. O. D. Dept. M.
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McCadden Machine Works,

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a
Man
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Neutralize Excessive Spring Action

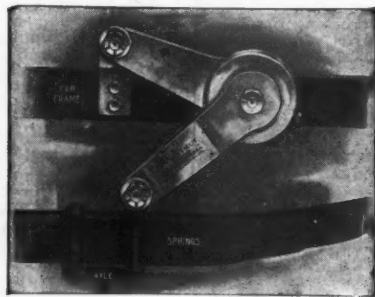
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You take no risk—we take it all.

Write for Bulletin No. 44

**Connecticut
Shock
Absorber Co.
Inc.
Meriden, Conn.**



Here is an Exhaust Horn that
is installed immediately

TREMO The Perfect Warning Exhaust Horn



**Price
Complete,
\$6 to \$7.50**
Special Ford Model,
complete \$5.00

The coupling of the TREMO EXHAUST HORN fits every tail pipe or muffler. A hammer—a wrench—a few minutes' work—and the horn is adjusted.

So insistent is the TREMO HORN that pedestrians will immediately respond to its warning. The exhaust is always clear—no back pressure on the motor.

In construction and operation the TREMO HORN is a thoroughly dependable and efficient signal.

SEND FOR OUR CIRCULAR—TODAY.

**The D. Henry Bonner Co., Inc.
Cambridge, Mass.
1276 Mill St.,**

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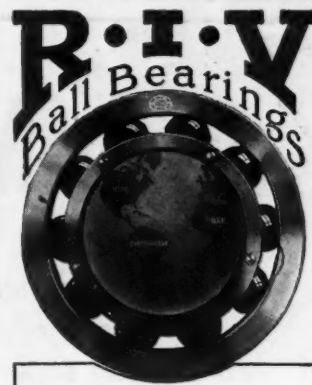
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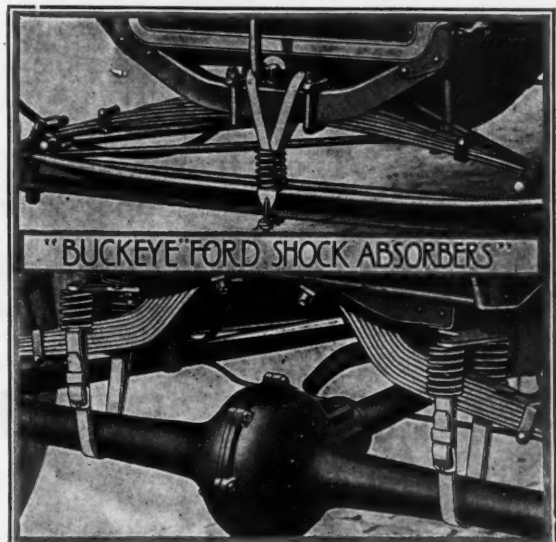
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Absolutely prevent broken springs, the absorbers taking the shock when springs rise above their neutral position. Front absorber also prevents excessive compression of front spring. Full oil tempered springs of best quality—attached in a few minutes' time—no holes to drill—simply clamp to frame.

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The Knight Motor Supreme

*Official test demonstrates beyond question
the superiority of the Knight type sleeve
valve motor over the poppet-valve type*

A short time ago a 6-cylinder 38 H. P. poppet-valve motor of high-grade manufacture was given an official test by the Automobile Club of America, in New York. It was run for 300 hours. During that time it averaged 35.7 horsepower—*less than its nominal rating. At the close of the test it showed less power than at the beginning, despite the fact that valves were twice adjusted in an effort to sustain the power.* This motor was of the latest and most highly improved design—but it was a poppet-valve motor.

Back in 1909—four years ago—a 4-cylinder 38 H. P. Knight sleeve valve motor was given a similar—but much harder—test. It was run on the block and on the road in a test covering 320 hours. During this test it averaged 53 horsepower—*40% more than its rating.* It was also driven 2000 miles on the famous Brooklands track, *and after all this it showed more power at the finish than at the beginning.* No adjustments were made to the mechanism of the motor at any time.

Thus every claim of the superiority of the Knight type motor has been officially and unmistakably proven *by the testimony of the poppet valve itself*, and this testimony again supports the statement of the Stearns-Knight that—

**The Stearns-Knight "Four" is better than any
poppet-valve "Six," and that—**

**The only car better than the Stearns-Knight "Four"
is the Stearns-Knight "Six"**

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Cleveland, Ohio

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Cleveland- Canton Automobile Springs

It means the utmost in safety, astounding strength and greater resiliency, for such steel will stand more severe strains than ordinary steel.

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Cleveland-Canton "Chrome-Vanadium" Springs are made by the "cross-rolled" method. The material is worked both longi-

tudinally and transversely, then heat-treated in oil.

It is not a cheap process, but it adds immeasurably to the life of a car. It means fewer repairs, less depreciation, freedom from engine racking and jolting.

Cross-Rolled Chrome-Vanadium

"Not a
Bump in
One of
Them"



"Built for
Life-Long
Endurance"

Cars equipped with poor springs soon gain a bad name among motorists. For the vibration, bumping and jolting quickly sends engines to the repair-shops.

Because makers realize this, more and more cars are being equipped with Cleveland-Canton "Chrome-Vanadium" Springs, which give utmost elasticity, absorbing shocks and protecting the car and its occupants from shaking and vibration.

Cleveland-Canton Chrome-Vanadium Springs are specified on the leading cars this year. They are built for enduring service—they are the *springs you should have on your car*. In five years not *one* Cleveland-Canton Chrome-Vanadium Spring returned because of breakage or settling.

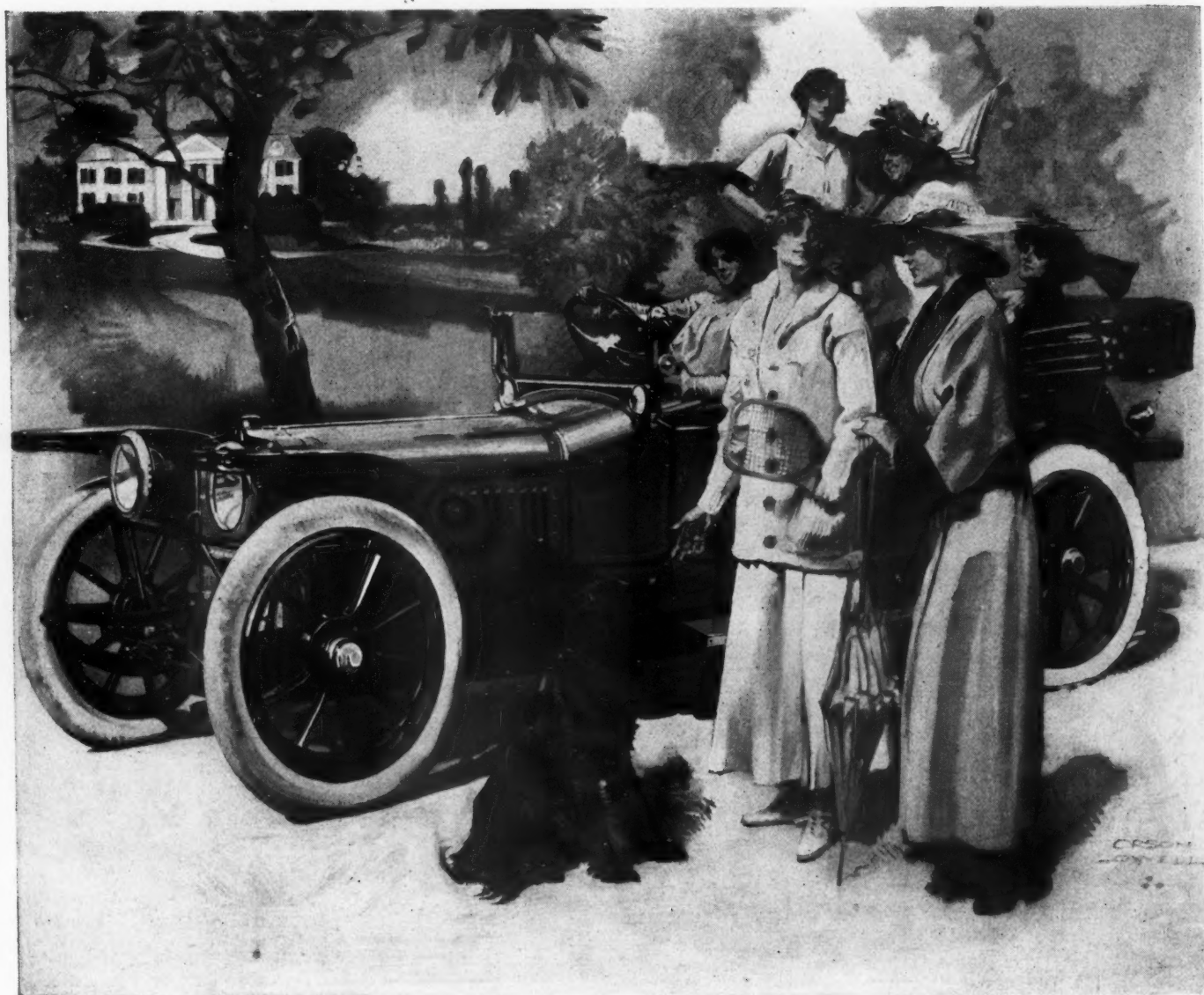
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Next Best — Special Analysis

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Canton, Ohio, U. S. A.



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